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THE SELECTION OF VOCATIONAL BOOKKEEPING STUDENTS

Submitted by

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(B.S. in B.A., Boston University, 1935)

In partial fulfillment of requirements for

the degree of Master of Education

1941

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CHAPTER I

INTRODUCTION

By "the selection of vocational bookkeeping students" is meant the selecting or choosing of those secondary school students who are qualified in various ways to elect and pursue a course in bookkeeping which is intended to lead to vocational employment.

The writer became interested in this subject because of the great overemphasis that is placed on the subject of vocational bookkeeping in the average secondary school which allows many students to major in this subject and subsequently fail to secure employment. A conservative estimate would be that fewer than twenty per cent of those who prepare for this type of work actually succeed in securing employment in that work or are successful in it. This situation brings about a serious guidance problem which is probably more serious in bookkeeping than in many other fields because of the rapid growth of the subject along with other commercial subjects. This is shown by the fact that between the years of 1915 and 1928 high school enrollments increased 102 per cent while during the same period commercial course enrollments increased 687 per cent. Similar growth is indicated for the years from 1928 to the present.

If it is true that only certain students possess the abilities, aptitudes and interests necessary to succeed in bookkeep-

ing and that more students are being trained than there are available positions, such a condition as S. W. Pursell found in Nebraska is worthy of note. The condition in Nebraska is shown in the following table[1].

TABLE I. BASIS FOR SELECTION OF BOOKKEEPING STUDENTS IN NEBRASKA

Basis of Selection	Number of Schools	Percentage of Total	
Elective to all in grades in which offered	153	85.5	98.8
Required of all in grades in which offered	21	13.3	
Chiefly for weak students	1	.6	
Students above certain mental level	0	.0	
Students showing special aptitudes in previous courses	1	.6	
Total	158	100.0	

From this table it is interesting to note that there is practically no selection at all. In 98.8 per cent of the schools bookkeeping is either elective to all in the grades in which it is offered or required of all in the grades in which it is offered. In only one case is it for students showing special aptitudes, which case is offset by one other school in which it is offered chiefly for the weak students. Not a single school limits the enrollment in bookkeeping to students of a certain mental level. This is evidence from one state, at least, which shows need of correction. No study was found that

[1] "Bookkeeping Teaching Aims", Balance Sheet, XVII (December, 1935), pp. 152-155, 187.

indicated conditions in other states differed greatly from the above Nebraska conditions.

E. G. Blackstone reports as late as the summer of 1940, in a summary of research in bookkeeping, that "prognosis in bookkeeping is in its infancy"[1] and that "prognostication attempts have not as yet been successful"[2] as "no correlations thus far reported are sufficiently high to serve as a basis for individual prediction"[3]. There is need for the development of some method of predicting a given pupil's success or failure in bookkeeping. The purpose of this thesis is to attempt to find such a method.

---

[1] "Summary of Research in Bookkeeping", The National Business Education Quarterly, VIII (Summer, 1940), pp. 15-16, 29-31.

[2] Ibid., p. 30.

[3] Ibid., p. 16.

CHAPTER II

NEED FOR SELECTION OF VOCATIONAL BOOKKEEPING STUDENTS

Before attempting to determine a method of predicting the success or failure of individual pupils in the subject of bookkeeping the need for the selection of vocational bookkeeping students must be justified.

At present there are too many students enrolled in bookkeeping in the secondary school. By that is meant that more pupils either have been allowed to take or have been guided into this subject than have been able to secure vocational employment in bookkeeping or accounting work. Moreover, the degree of this "overenrollment" in vocational bookkeeping classes is, in many cases, alarming.

F. G. Nichols states that:

> all occupational surveys tend to indicate that .... too many bookkeepers .... are trained. The quality of training given and the low ability of pupils trained may explain the situation .... .[1]
>
> .... only about two per cent of office workers are bookkeepers.... . Only a relatively small number of boys and girls possess the aptitudes, interest, and abilities required for these positions.[2]

---

[1] Commercial Education in the High School, p. 192.

[2] Ibid., p. 212.

> Of 34,513 office employees reported by 37 firms, 3,451, or 10%, are stenographers, and 656, or 1.9%, are bookkeepers. Thus, ... approximately 12% of office .... workers are doing the two kinds of work for the doing of which approximately 80% of high school business training is given.[1]

E. G. Blackstone states that:

> Since it (bookkeeping) has been taught extensively in high schools and business colleges, it seems that the time has come when more bookkeepers are being trained than can secure bookkeeping positions. Probably not more than 10 per cent or 20 per cent secure bookkeeping jobs.[2]

After an investigation along these lines, C. L. Cushman found a great contrast between the numbers employed in various occupations in the city of Denver and the enrollment in the high schools of commerce. A summary of his findings is as follows:[3]

---

[1] A New Conception of Office Practice, p. 42.

[2] "Summary of Research in Bookkeeping," The National Business Education Quarterly, VIII (Summer, 1940), p. 15.

[3] "Guidance of Commercial Pupils for Vocational Pupils," Journal of Business Education, x (November, 1934), p. 9.

TABLE II. RATIO OF EMPLOYMENT TO ENROLLMENT IN DENVER, 1930-1934

Type of Position	Employment in Denver, 1930	Enrollment May, 1934	Ratio of Employment to Pupils
Males			
Secretarial	227	29	8 - 1
Accounting	2,604	45	58 - 1
Clerical and Selling	13,523	20	676 - 1
Total Males	16,354	94	174 - 1
Females			
Secretarial	4,379	454	10 - 1
Accounting	2,169	30	72 - 1
Clerical and Selling	6,483	6	1080 - 1
Total Females	13,031	490	27 - 1

TABLE III. RATIO OF POSITIONS SECURED TO ENROLLMENT IN DENVER, 1933-1934

Type of Position	Positions Secured by Graduates, 1933	Commercial Enrollment 1934	Ratio of Employment to Enrollment
Males			
Secretarial	0	29	0 - 29
Accounting	3	45	1 - 15
Clerical and Selling	107	20	5 - 1
Total Males	110	94	1.2 - 1
Females			
Secretarial	18	454	1 - 25
Accounting	10	30	1 - 3
Clerical and Selling	60	6	10 - 1
Total Females	88	490	1 - 5.6

> The point which stands out above all others in these two tables is that the number of pupils taking training for clerical and sales work is exceedingly small when contrasted with the number of positions of this type in the city.
>
> It is readily apparent that the distribution of enrollment in the high schools as between the courses in salesmanship and the courses in secretarial training is the reverse of the distribution of employment.[1]

Earl Clevenger states that:

> For each thousand students enrolled in bookkeeping last year, a conservative estimate indicates that not more than fifty of these are now employed in business offices as bookkeepers. In other words, only about five per cent of our bookkeeping students actually become bookkeepers.[2]

These four statements are typical of many that point out that only from five to twenty per cent of the bookkeeping students in the secondary schools today secure employment as bookkeepers.

The reasons for this "overenrollment" are obvious. First, there is the "white-collar" appeal. Students and their parents have the false notion as to the standing, respect and earning power that various "white-collar" workers have, whereas, in reality, skilled trade workers command far greater respect and

---

[1] C. L. Cushman, op. cit., p. 9.

[2] "Social Values of Bookkeeping," Journal of Business Education, XV (September, 1939), pp. 13-14.

higher wages. This is especially true when positions of skilled workers are compared with the types of "white-collar" positions that are held by high school commercial graduates.

Second, many pupils, because of their home conditions, cannot go to college or study beyond high school and feel that the next best thing is to take the commercial course to prepare themselves for employment. M. B. Dilley finds that the "parents of those who took bookkeeping in South Bend (Indiana) High School are mostly (70%) common or factory laborers".[1] This seems to be even more so since the recent depression. H. G. Shields states that "there is no question but that students enrolled in the commercial curricula come from families of lower paid workers and are enrolled in such work because of the blind faith that they have that it will somehow get them out of their economic strata".[2]

Third, that the commercial curricula are the "dumping grounds" of the secondary school has been heard numerous times. However, it remains the truth that academically-minded junior high school teachers and guidance counselors often encourage pupils of low mentality to pursue commercial work because the advisers feel that the students cannot successfully complete

---

1"Some Aspects of the Vocational Value of Bookkeeping in South Bend, Indiana," Balance Sheet, XIII (November, 1931), pp. 89-90, 114.

2"Our Clerical Mills," School and Society, XXXI (April 5, 1930), pp. 461-463.

the academic course.

These facts and figures show definitely a tremendous "over-enrollment" in vocational bookkeeping and some of the reasons for it. More students are studying the subject than can ever use it vocationally. A selection of only the best bookkeeping prospects for the study of vocational bookkeeping should at least partly solve this undesirable situation.

CHAPTER III

ADVISABILITY OF SELECTING VOCATIONAL BOOKKEEPING STUDENTS

In the previous chapter the need for the selection of vocational bookkeeping students was justified on the basis of existing conditions. Before continuing in an attempt to solve the problem it is advisable to consider the advantages to be gained and the disadvantages that may be suffered when and if a satisfactory method of selecting vocational bookkeeping students is found. Only after such a consideration can a conclusion be reached satisfactorily concerning the advisability of the wide adoption of such a plan of selection of students.

There are three main advantages of the plan of selecting vocational bookkeeping students rather than allowing any pupil, who so wishes, elect the course. They are as follows:

1. Better Guidance.

There is insufficient and unsatisfactory guidance in the secondary school commercial field. Proof of this condition was presented in the previous chapter where it was shown that only from five to twenty per cent of the pupils studying bookkeeping secure employment in that field of work.

F. G. Nichols lists seven reasons for the lack of guidance which are as follows: 1) a desire for a big department on the

part of commercial teachers, 2) a tendency to be content with traditional courses which no longer satisfy the need for vocational business training, 3) commercial teachers too often teachers of subjects instead of trainers of workers, 4) the commercial department not responsible for failures, 5) mixed classes, 6) teachers with little business experience and 7) little or no responsibility for placement and follow-up placed on teachers.[1]

Few, if any, of these reasons for lack of satisfactory guidance can be justified as sound. The size of the secondary school commercial department has nothing whatsoever to do with the quality of the graduate. To induce a large enrollment in vocational bookkeeping simply because it is the traditional thing to do is nonsense. There is no excuse that teachers can offer to justify teaching subjects rather than training workers. The commercial department should assume responsibility for its failures, placement and follow-up if the students are to be given a satisfactory vocational education in the secondary school. The only reason given in the above group that hinders satisfactory guidance in secondary school commercial education is lack of business experience on the part of teachers, but that alone is not reason enough to overcome the possibility of selecting vocational bookkeeping students.

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[1] "Some Observations on Vocational Guidance in Commercial Education," Eastern Commercial Teachers Association, Ninth Yearbook, (1936), pp. 22-32.

But there is no question concerning a serious lack of guidance which is due partly, at least, to allowing anybody who so desires to study bookkeeping regardless of his abilities and aptitudes.

Merely because a subject is offered in a public school is no reason why anybody who so wishes should be allowed to take it if it is not to his advantage to do so. When he is graduated from school or leaves school he is not allowed to do that work he wishes if he is not qualified for it. He is given that work which he is capable of doing or of learning how to do.

There are individual differences in regard to bookkeeping aptitudes and they must be recognized. To guide pupils into a course which they like and for which they are suited is only part of the guidance problem. It is just as important to guide people out of courses for which they are not suited. It is unfair to the student to allow him to study vocational bookkeeping at all with the idea that he can secure employment in the field if it can be determined in advance that his opportunity of securing employment is very slim.

Bookkeeping courses should not be a refuge for anyone who thinks that he likes the subject. He must be qualified. Many of the present weaknesses in the bookkeeping course can be improved or entirely eliminated if students are selected and those students not fitted for the subject can be given some

other course better meeting their abilities and needs.

2. Advantages of Homogeneous Grouping.

Homogeneous grouping is not common in commercial classes today to any great extent. By such is meant the grouping in various classes pupils of approximately the same intelligence quotients, interests, aptitudes, etc. Many pursue the commercial course for general education, others because of their desire for a business course and still others because of their dislike for academic work or because no other department will have them. Thus, in a given bookkeeping class are found some who are interested, others who aren't; some who can do the work, others who can't; some who have a real purpose in being there, others who haven't. In a given class are found great differences in intelligence, sex, ability, purpose and attitude. F. G. Nichols tells of a "recent piece of research in which the I. Q.'s of over 3,000 commercial pupils were considered, the lowest I. Q. was 77 and the highest 156."[1]

H. G. Enterline gives as examples "the bright boy who is lazy and who is looking for easy credit; there is the dull girl who has hopes of becoming an accountant; there is the prospective "drop-out" who is disinterested and who is planning to leave school as soon as he reaches his next birthday".[2]

[1] Commercial Education in the High School, p. 24.

[2] "Solving the Bookkeeping Problem," Balance Sheet, XXII (February, 1941), p. 254.

Numerous other examples could be given to show the many differences found in students in a class when no selections have been made.

The advantages of homogeneous grouping which would be accomplished if vocational bookkeeping pupils were selected and segregated are many. The most important of these are the following:

1) pupils would be placed in competition with others of fairly equal ability,
2) slow groups would not be discouraged by the superiority of others,
3) curriculum differentiation would be made easier,
4) the work of the teacher would be facilitated,
5) it would produce groups more congenial socially, and
6) standards could be raised.

The last mentioned advantage is quite important, especially since the great increase in enrollment which has most certainly lowered the average of the intelligence quotient. If the commercial diploma is to have the meaning that it might have to business men and they are to be given the type of graduates that they want, more careful selection must be made. In this way only can the standards of accomplishment be raised. In this way only will the business men come to look upon the high school as a satisfactory source of employees.

3. Reduction of Failures.

H. Chester Nelson reports that in the Windham High School of Willimantic, Connecticut, there had been a 43.7 per cent of unsatisfactory work in beginning bookkeeping during a recent four-year period.[1] That, no doubt, is a very high percentage of unsatisfactory work but probably shows that bookkeeping has certain requisites of such things as arithmetic, industry, intelligence, etc. Otherwise, more pupils would have done satisfactory work.

Pupils are now found in the vocational bookkeeping classes "who can neither add, multiply, subtract, nor divide, who write poorly and compute worse, who cannot see the effect of a business transaction even when it is analyzed for them by the teacher".[2] Naturally, these will fail.

When students get in classes where they fail, that failure often brings a certain disappointment, a dislike for school which often leads to pupils leaving school. If students are selected for bookkeeping classes on their ability and interests, and the remaining students placed in other courses for which they are better fitted, there should be a corresponding reduction of failures.

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[1] "A Study in Bookkeeping Prognosis in the High School". Unpublished Master's thesis of Columbia University,

[2] F. G. Nichols, "Some Observations on Vocational Guidance in Commercial Education", ECTA Ninth Yearbook, (1936) pp. 22-32.

The disadvantages of selection of pupils for vocational bookkeeping classes are as follows:

1. Undemocratic.

There are those who say that it is undemocratic and unfair to allow one pupil to take a certain course and forbid another pupil to do the same in a democratic society, a society of equal rights and opportunities, in public schools which are open to all. This raises the problem as to how far a school counselor should go in advising a pupil that he is not fitted for a certain course and cannot take it, in telling the parent that his son or daughter shouldn't attempt a certain piece of work. What school administrator today is so familiar with the necessity of certain aptitudes, interests and abilities needed to do satisfactory bookkeeping work and the degree to which they are needed as to say definitely that this pupil can and this pupil cannot do bookkeeping? Isn't a public school that offers various types of courses and training for all who wish those courses and training? Don't all pupils attending a public school have equal opportunities?

2. Disadvantages of Homogeneous Grouping.

Just as the principle of homogeneous grouping has its advantages, so does it have its disadvantages and the following questions might well be raised at this point. Wouldn't such segregation of pupils according to ability tend to create class

distinctions in the minds of the pupils? Won't the slower pupils lose stimulus and the contributions of the brighter pupils? Won't school administration be complicated? Won't it be resented by the parents?

Questions raised in the above discussion of the disadvantages of selection of vocational bookkeeping pupils are answered in the following paragraphs.

Consideration of Advantages and Disadvantages of Selection of Vocational Bookkeeping Students.

The main reason for this plan, better guidance, ability grouping and reduction of failures, hold up much better under investigation than do the reasons against this plan. They have been discussed rather thoroughly but the disadvantages of such a plan will be further discussed.

The first reason against this plan of selection of vocational bookkeeping students is that it is undemocratic, that it does not allow free election of courses, etc. Under this plan it is not assumed that a pupil would be told dogmatically that he could not elect vocational bookkeeping but rather that he be advised to elect some other course because of the result of tests, the number of positions available in the community, etc. With very few exceptions pupils accept such advice when it is given in the right way. As William L. Moore states: "regardless of our theoretical ideas, our present economic society

is based upon the proposition that those who are most capable in any given line are the ones who will be first utilized and be considered successful"[1]. In the business world, employees are not given work to do for which they are not suited or which they are not capable of doing or learning how to do. Why should we attempt to train them for such work in schools? Little trouble should be met in this type of guidance work and merely because a pupil or his parent now and then insists on the pupil taking vocational bookkeeping and he is therefore allowed to do so, the whole plan should not be discarded.

The second disadvantage of this plan, that of the disadvantages of homogeneous grouping, does not seem to be strong enough to outweigh the advantages. There should be no reason for the creation of a feeling of class distinction simply because various pupils are in courses for which they have particular abilities and aptitudes. Stimulus that will be lost by the pupil who is slow would be of little value to him if he could not do the work because of lack of arithmetic ability, low I. Q. or for some other reason. The school administration should not be complicated unless the school is very small. In such a case, the bookkeeping class might better offer for all some vocational and some personal-use bookkeeping during the first year. The parents should not resent such a plan of se-

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[1]"Effective Pupil Guidance", Business Education World, XV (April, 1935), pp. 609-613.

lection if it is properly carried on. In the school where the writer teaches such work has been carried on for four years with very little interference by the parents. But, as was stated above, one parent should not be allowed to interfere with the welfare of the school. If a parent so insists, his child should be allowed to take the course on his own responsibility, pass or fail.

Thus, opposed to stronger and better guidance, the advantages of homogeneous grouping and the reduction of failures are found only the arguments of the plan being undemocratic and having the disadvantages of homogeneous grouping. It is not undemocratic in that the pupils will not be definitely told that they cannot under any circumstances elect vocational bookkeeping but rather will be advised not to do so and the disadvantages of homogeneous grouping are weak when compared with the advantages of that principle. Therefore, further adoption of such a plan is advisable when and if a satisfactory method of selecting vocational bookkeeping students can be determined.

The following chapters of this thesis deal with an attempt to solve that problem.

CHAPTER IV

TYPE OF DATA USED AND LIMITATIONS IN ATTEMPT TO SOLVE PROBLEM

A. Type of Data.

The need for and the advisability of finding a method of predicting success or failure in vocational bookkeeping have been discussed in the previous chapters of this thesis.

An attempt to find such a method was made by analyzing research papers of various writers who have worked on the same problem of bookkeeping prognosis. These data were supplemented by material available from the records of the Whitman (Massachusetts) High School. Thework on this problem was found to be very limited at the present time and has met with little success thus far. However, certain research works were chosen from these few studies available on the subject of prediction of bookkeeping achievement because they were of value in the present study. These have been summarized and these summaries may be found in Appendix A of this thesis. They have been lettered a, b, c, etc. and are thus referred to throughout the following pages.

The analysis of these studies has been carried out by grouping the various factors from them such as arithmetic, intelligence, etc. and studying their relationship to achievement in bookkeeping. Conclusions were then drawn concerning their

reliability and worth in the solving of the problem at hand.

Following this, certain material available at Whitman (Massachusetts) High School was considered. Vocational bookkeeping students have been selected at that school for several years and the methods of selection used there were considered. This material, together with the analyses of work done elsewhere, led to certain conclusions and recommendations concerning the problem which were then presented.

B. Limitations of Work on Bookkeeping Prognosis.

Before the above analyses were presented, however, it was desirable to consider certain limitations to research on bookkeeping prognosis. Considerations and conclusions of the research that has been done by various writers on this problem were most difficult. This was so because of the great variations found among the various writers and workers on the subject. All have attacked the problem by determining coefficients of correlation between success in bookkeeping on one hand and success in some other school subject, some aptitude or intelligence test on the other hand. The method of correlations was the only logical way to attempt a solution of the problem. But the many variations limited the reliability of the analyses to a very great extent.

For example, many have correlated arithmetic ability with bookkeeping achievement. The arithmetic ability, however, has

been measured by various tests and teachers' grades in arithmetic courses and the bookkeeping achievement has been measured by various test scores and teachers' grades in bookkeeping courses. The arithmetic tests and the bookkeeping tests were, of course, of many types even as the teachers' grades in both arithmetic and bookkeeping were, of necessity, subjective and thus differed greatly. Even as teachers differed in personality and teaching ability, even as one test differed from the others, so did one teacher grade pupils on different bases, one primarily on the basis of tests (some stressing theory and others stressing practice), one on the basis of industry, one with much credit for penmanship, etc.

Another reason for the difficulty in arriving at definite conclusions was the fact that many of the correlations found and reported by the various writers on the subject were based on too few cases to definitely establish a true correlation that was unquestionably reliable. As an example of this, Forsgard[1] (Appendix A g) correlated five factors with an objective-type bookkeeping achievement examination but the correlations were based on only from forty to forty-nine cases. All these students were from one school and possibly differed greatly in training, background, etc. from pupils in other schools.

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[1]Fred G. Forsgard, "Indices to Mastery in Business Courses", Journal of Business Education, XVI (February, 1941), pp. 17-18, (March, 1941), pp. 13-14.

Still another reason for the difficulty in arriving at any definite findings was the fact that no one had set up truly objective means of testing various factors or achievement that have been widely accepted. No one had composed an arithmetic test, for example, that was thought by many to satisfactorily test the type of arithmetic needed for bookkeeping work. Too many correlations were based on arithmetic teacher grades which, in turn, were too often based on the success of the pupils in the work done because it was in the particular text to which they had been subjected. This text may have included much material wholly or partly irrelevant to bookkeeping. Many more correlations were based on scores in arithmetic tests which were weak in the same respect.

Moreover, bookkeeping achievement, also, was tested in many ways. Many correlations were based on bookkeeping teacher grades which were truly subjective, as has been explained. Many more correlations were based on various bookkeeping achievement examinations, some standard and others not standard. Simply because a bookkeeping achievement test has been standardized is no proof that it truly tests achievement. A consideration of the Elwell-Fowlkes Bookkeeping Test shows this to be true. A copy of this test is in Appendix B which contains various aptitude and achievement tests referred to in this thesis. These tests have been lettered a, b, c, etc. as have abstracts in Appendix A. The Elwell-Fowlkes Bookkeeping Test is lettered g.

It contains sections on general theory, including true-false, multiple-choice and completion questions, a section on classification composed of checking questions, a section on journalizing composed of multiple-choice questions, a section on adjusting and closing entries composed of multiple-choice questions and a section on statements including true-false, completion and yes-no questions. Does that truly test one's achievement in bookkeeping? It does not seem so. There is no consideration of such important items as penmanship, ability in arithmetic, details of posting, ability to take a trial balance, ability to rule and balance accounts, ability to carry a complete set of transactions through the bookkeeping cycle from journalizing to ruling and balancing the ledger and to taking a post-closing trial balance, etc. Need one go on? It lacks material to test many of the most necessary and important items in bookkeeping instruction. It is strictly a theory test, lacking much in the phases of bookkeeping practice. Other tests of bookkeeping achievement are likewise weak. Many writers have chosen one of Carlson's so-called "publisher's tests". Examples of Carlson's tests are included in Appendix B, lettered h and i. Carlson's bookkeeping tests test only one phase of a year's work, the material in only a few chapters in South-Western Publishing Company's "Twentieth Century Bookkeeping and Accounting" textbook. Is that the total of bookkeeping achievement? Because a pupil can do well in true-false questions on theory, can check the classification of accounts, can analyze

a transaction for debits and credits when the account titles are given, etc., is that a true test of achievement in all the many phases of bookkeeping achievement? It does not seem so.

To avoid a misunderstanding, however, it must be stated here that these various achievement examinations and tests have a very definite value when properly used but many of them do not test all the phases of bookkeeping or in the proportions of their importance. Even with these limitations of standard bookkeeping achievement examinations that cannot be forgotten, these objective tests are the best method available for testing bookkeeping achievement.

It is truly possible that many if not most teachers' grades are good indications of real achievement even though they are subjective. A teacher is certainly more apt to give more consideration to penmanship, arithmetic, reasoning ability, perseverance, interest, etc. than does any one test. But, of course, the weakness in bookkeeping teachers' grades is that a certain element considered important by one is neglected by another. A correlation that is high as between a certain arithmetic test score and a certain bookkeeping teacher's grade may be low as between that same arithmetic test score and a second bookkeeping teacher's grade.

It is likewise true that a correlation that is high as between an intelligence quotient obtained on one intelligence

test and a certain standard bookkeeping achievement test may be relatively low as between that same intelligence quotient and a second standard bookkeeping achievement test that stresses different aspects of the subject.

C. Interpretations of Correlations for Prognostic Purposes.

The above discussion is not intended to convey the impression that the research in bookkeeping prognosis is worthless simply because it has the aforementioned weaknesses. Rather it is intended to convey the idea that it does have definite limitations and that certain weaknesses are present. Even with those weaknesses there were certain implications for all in the correlations thus determined. If correlations determined by correlating some one factor, whether shown by grades or test scores and bookkeeping achievement, as determined by a standard test in bookkeeping achievement, ranged, let us say, from .40 to .60 or from .50 to .70, there was sufficient proof to conclude that such a correlation determined by similar material in another school would probably fall within such a range. Therefore, correlations that have been determined between certain factors and bookkeeping achievement were considered to have definite value for this study. The range determined by such correlations probably included most of the similar correlations determined by other research workers that have not been reported or were not available for this study. Because of that reason like correlations that have been determined by various

writers have been analyzed in the following chapters in an attempt to determine their value in the solution of the problem.

As a basis on which to interpret the findings of the various writers on the subject of bookkeeping prognosis, it is appropriate to present here the views of several authors of books on statistical measures in the field of education.

Rather than discuss the opinions of these writers in a field about which there is considerable difference of opinion it is more advisable to quote directly from their books so that their exact expressions of opinions may be given.

First there are given two quotations which concern coefficients of correlations in general. Second, there are two quotations which apply more particularly to the problem at hand, that of the use of coefficients of correlation as a means of determining the value of a factor or of factors to be used for prognostic purposes.

Coefficients of correlation in general.

> This definition of limits depends largely on the personal experience of the person making the interpretation. For example, it has been common for certain educational investigators to arbitrarily interpret a coefficient of .25 as an indication of "high" positive correlation, and one of .40 as "very high". Others would interpret .25 as "very low", and .50 as "marked" or "somewhat high". Certainly, our educational conclusions must be colored by our arbitrary definition of such a coefficient.

> The experience of the present writer in examining many correlation tables has led him to regard correlation as "negligible" or "indifferent" when r is less than .15 to .20; as being"present but low" when r ranges from .15 or .20 to .35 or .40; as being "markedly present" or "marked" when r ranges from .35 or .40 to .50 or .60; as being "high" when it is above .60 or .70. With the present limitations of educational testing few correlations in testing will run above .70 and it is safe to regard this as a very high coefficient.[1]

> There seems to be a sort of rough agreement among workers in this field(educational measurements) that when r is o to +.4 thecorrelation is low, or +.4 to +.7 the correlation is substantial, or +.7 to 1.0 correlation is high.[2]

Coefficients of correlation for prognostic purposes.

> For purposes of prognosis, ..., a correlation of .50 is very low indeed,[3]

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[1]William A. McCall, How To Measure In Education.

[2]Harold O. Rugg, Statistical Methods Applied To Education.

[3]Arthur S. Otis, Statistical Method in Educational Measurement.

TABLE IV. HULL'S SUMMARY OF CORRELATIONS AND THEIR PROGNOSTIC VALUES[1]

Correlation	Value
Below .50	Practically useless for prognosis
.50 to .60	Possibly useful
.60 to .70	Of genuine but limited value
.70 to .80	Of decided value but rarely or never found
Above .80	Not obtained by present methods

The last two quotations were important at this point in the attempt to find a method of selection of vocational bookkeeping students. Otis[2] stated that "a correlation of .50 is very low indeed" while Hull[3] stated that those between .60 and .70 are of limited value and those between .70 and .80 are of decided value.

The discussion of various factors and their relationship to success in bookkeeping in the following six chapters was based on the opinions of these authors.

The immediate plan of this thesis for the next five chapters is to consider the relationship of arithmetic ability, in-

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[1]Clark L. Hull, "The Correlation Coefficient and Its Prognostic Significance", Journal of Educational Research, XV No. 5, (May, 1927), pp. 327-338.

[2]Arthur S. Otis, op. cit.

[3]Clark L. Hull, op. cit.

telligence ratings and scores, aptitude tests, subject grades and miscellaneous factors, in that order, to bookkeeping achievement.

CHAPTER V

RELATIONSHIP OF ARITHMETIC ABILITY TO BOOKKEEPING ACHIEVEMENT

In the consideration of this and the following correlations the limitations and the interpretations of correlations for prognostic purposes that have been previously discussed were constantly kept in mind. They were the bases on which the relationship of arithmetic ability to bookkeeping achievement was considered.

As a further basis for the consideration of this relationship a summary of correlations between arithmetic ability as measured by both test scores and grades and bookkeeping achievement as measured by both test scores and grades was prepared and is presented on the following pages of this thesis. The correlations are in four tables because of the four combinations of like correlations. Arithmetic test scores have been correlated with both bookkeeping teacher grades and bookkeeping test scores. The various combinations were considered individually.

The most reliable of these correlations were, of course, those which have been determined by objective tests in both the arithmetic factor and the bookkeeping achievement. Three such correlations were found. They are found in table V on the following page.

TABLE V. RELATIONSHIP OF ARITHMETIC TEST SCORES TO BOOKKEEPING TEST SCORES

Investigators	Data	Correlations
Strauss	New Jersey State Arithmetic Examination and Bowman and Percy Tests	.510±.043
O'Brien	"Fundamental Operations of Arithmetic and in Problem Solving" by Reavis and Breslich and Elwell-Fowlkes Test	.404±.041
Fitzpatrick	Regents Test and Carlson Bookkeeping test.	.389±.052

TABLE VI. RELATIONSHIP OF ARITHMETIC GRADES TO BOOKKEEPING TEACHER GRADES

Investigators	Data	Correlations
Martin	Commercial Mathematics I and Bookkeeping I	.459±.018
Martin	Commercial Mathematics II and Bookkeeping I	.568±.015
Nelson	Grades	.540±.030
Rosenblum	Grades	.493±.060

TABLE VII. RELATIONSHIP OF ARITHMETIC TEST SCORES TO BOOKKEEPING TEACHER GRADES

Investigators	Data	Correlations
Stedman	Stedman's Test and Grades	.628±.060
O'Brien	Reavis and Breslich (title above) and Grades	.219±.047
Fitzpatrick	Regents Test and Grades	.198±.056

TABLE VIII. RELATIONSHIP OF ARITHMETIC GRADES TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlation
Rosenblum	Grades and Carlson Test #3	.493±.039

Harold W. Strauss used the New Jersey State Examination in Arithmetic and four Bowman and Percy objective bookkeeping tests (given after the study of chapters 4, 15, 26 and 33 in "Principles of Bookkeeping" by Bowman and Percy) in testing 134 students in the ninth grade of the Roosevelt Junior High School at New Brunswick, New Jersey. The bookkeeping test scores were added together to obtain a total score in arithmetic before it was correlated with bookkeeping achievement. A correlation of .510±.043 was obtained.[1]

Henry J. Fitzpatrick correlated the New York State Regents Arithmetic examination with a Carlson bookkeeping achievement test (published by the South-Western Publishing Company to accompany "20th Century Bookkeeping and Accounting") that was given at the end of the first report period. The testees were regularly enrolled students of the Commercial Department of the high school at Albany, New York. The correlation was found to be .389±.052.[2]

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[1] "The Effect of General Intelligence and Achievement in Arithmetic on Success in Bookkeeping", Unpublished Master's Thesis of Rutgers University, 1930.

[2] "Success in Elementary Bookkeeping as Related to Success in Certain Other High School Subjects and to Intelligence Ratings". Unpublished Master's Thesis of N. Y. State College, 1928.

Thus, the three correlations determined by correlating arithmetic test scores with bookkeeping achievement test scores were .510±.043, .404±.041 and .389±.052. All of these correlations were purely objective and therefore were the most reliable group of the four presented. They were found to be fairly well grouped with a range of only about .12 points from .389±.052 to .510±.043. On the basis on which these correlations were judged, that those below .65 were of doubtful value, the factor of arithmetic by itself was not reliable enough to be used as a sole basis for prediction of pupil success or failure in bookkeeping.

The subjective element of teachers' judgment entered into all the other correlations, one of which used bookkeeping teacher grades and arithmetic teacher grades, one of which used bookkeeping teacher grades and arithmetic test scores and one of which used bookkeeping test scores and arithmetic teacher grades. Correlations between arithmetic teacher grades and bookkeeping teacher grades were found to range from .459±.018 to .568±.015 and to have a central tendency of about .515, as shown in Table VI. Although very subjective, these seemed to bear out the correlations discussed above which were purely objective.

The correlations determined on the basis of arithmetic test scores and bookkeeping teacher grades were .198±.056, .219±.047 and .628±.060 (Table VII), a considerable range proba-

bly due to the subjective element of teacher judgment in bookkeeping which might have stressed to very different degrees such elements in bookkeeping as penmanship, neatness, industry, etc., factors not tested in the arithmetic test.

Only one correlation was found which was determined by correlating arithmetic teacher grades and bookkeeping test scores, one of .493±.039 (Table VIII). This fell within the range of the correlations of the wholly objective measures discussed above but could not be relied upon to any great extent for two reasons; it was the only one of its kind and therefore not substantiated and it was subjective.

The following conclusions were drawn from the correlations found between arithmetic ability and bookkeeping achievement. On the basis of the correlations between the objective arithmetic test scores and the objective bookkeeping achievement test scores, three of which had a central tendency in the middle forties and were fairly well grouped, the factor of arithmetic is not reliable enough to be used alone in predicting pupil achievement in the study of bookkeeping. The tests, however, were ordinary commercial arithmetic tests, and not specially constructed tests composed of the types of arithmetic most necessary for bookkeeping work. The correlations are high enough and consistent enough so that it might well be that further work should be done in the development of an arithmetic test scientifically constructed of those problems which are

most necessary for the doing of bookkeeping work. Then and only then will the true relationship of arithmetic and bookkeeping success or failure definitely be known.

CHAPTER VI

RELATIONSHIP OF INTELLIGENCE TO BOOKKEEPING ACHIEVEMENT

In this group of correlations between intelligence and bookkeeping achievement, five types were considered. These correlations were between the following groups of factors and measurements of bookkeeping achievement: intelligence quotient and bookkeeping teacher grades, intelligence quotient and bookkeeping test scores, mental age and bookkeeping teacher grades, mental age and bookkeeping test scores and a combined intelligence quotient and arithmetic score and bookkeeping test scores. A summary of these correlations is presented in tables IX to XIII, inclusive, on the following pages.

All the factors of prediction in these cases were objective but again there were limitations in the measurements of bookkeeping achievement because of the subjective element of teacher grades in two cases or two groups of correlations.

The first type in this group to be considered were the correlations between intelligence quotients and bookkeeping test scores. Strauss (Table XII) used the Otis test to determine the intelligence quotients and four Bowman and Percy tests to measure bookkeeping achievement and tested 134 pupils in the Roosevelt Junior High School of New Brunswick, New Jersey. The correlation thus determined was .770±.024.

TABLE IX. RELATIONSHIP OF INTELLIGENCE QUOTIENT AND ARITHMETIC TEST SCORE TO BOOKKEEPING TEST SCORE

Investigator	Data	Correlation
Strauss	Otis and State Examination and Total of 4 Bowman and Percy Tests	.82

TABLE X. RELATIONSHIP OF INTELLIGENCE QUOTIENT AND BOOKKEEPING TEACHER GRADES

Investigators	Data	Correlations
Nelson	Terman Group Test	.410±.030
O'Brien	Otis	.109±.048

TABLE XI. RELATIONSHIP OF MENTAL AGE TO BOOKKEEPING TEACHER GRADES

Investigators	Data	Correlations
Stedman	Terman	.557±.070
Nelson	Terman	.300±.040
O'Brien	Otis	.082±.049
Fitzpatrick	Not Available	-.031±.059
Rosenblum	Terman	.129±.078

TABLE XII. RELATIONSHIP OF INTELLIGENCE QUOTIENT TO BOOKKEEPING TEST SCORES

Investigators	Data	Correlations
Strauss	Otis and Bowman and Percy Tests	.770±.024
O'Brien	Otis and Elwell-Fowlkes Test	.472±.038
Forsgard	Otis and Forsgard's Test	.549±.075

TABLE XIII. RELATIONSHIP OF MENTAL AGE TO BOOKKEEPING TEST SCORES

Investigators	Data	Correlations
Stedman	Terman and Carlson Test	.648±.057
O'Brien	Otis and Elwell-Fowlkes Test	.606±.031
Rosenblum	Terman and Carlson #3 Test	.386±.067
Fitzpatrick	Carlson #3 Test	.227±.059

O'Brien (Table XII) tested 191 students with the Otis test and the Elwell-Fowlkes Bookkeeping Test and arrived at a correlation of .472±.038.

Forsgard (Table XII) tested forty pupils, using the Otis test for the intelligence quotient and his own bookkeeping achievement test and found a correlation of .549±.075.

These three correlations between intelligence quotient and bookkeeping test scores ranged from .472±.038 to .770±.024, a range of under .30 and a central tendency in the very high fifties, a very significant relationship.

The second type in this group of correlations was between mental ages and bookkeeping test scores. By mental age is meant the raw score on an intelligence test before it has been adjusted with the chronological age to determine the intelligence quotient..

Stedman (Table XIII) tested 75 children in the Bell High School in Los Angeles. The intelligence age range of these children was from 73 to 123 with an average of 95. The total score of the Terman Group Test of Mental Ability was correlated with Carlson's Bookkeeping Test and the correlation was found to be .648±.057.

O'Brien (Table XIII) tested 191 pupils in a large senior high school using the Otis Self-Administering Test of Mental Ability - Higher Examination - Form B and the Elwell-Fowlkes Bookkeeping Test. The correlation was found to be .606±.031.

Rosenblum (Table XIII) used the data available for 70 pupils in the ninth year at the East New York Junior High School. The correlation was .386±.067 between the Terman Group Test of Mental Ability and Carlson's Bookkeeping Test #3.

Fitzpatrick (Table XIII) tested the regularly enrolled students of the commercial department of the high school at Albany, New York. He used the official school ratings in intelligence tests (raw scores) and Carlson's Bookkeeping Test #3 and arrived at a correlation of .227±.059.

Thus, the four correlations between mental ages and bookkeeping achievement as measured by objective tests ranged from .227±.059 to .648±.057, a range of over .40 with a central tendency of about .47, neither high enough nor consistent enough on the basis of available material to be significant in the solution of the present problem.

The limitations of teacher grades because of the subjectivity of such measures of achievement in bookkeeping were clearly shown by the wide range of correlations between mental ages and bookkeeping teacher grades which was -.031±.059 to .557±.070 (Table XI), a range of almost .60 and a central tendency of about .21. These correlations were considered of little value in this study for this reason.

The same may be said of the correlations of .410±.030 and .109±.048 (Table X) between intelligence quotient and bookkeeping teacher grades. Only two could be found and the teacher grades were subjective.

A most interesting correlation was found by Strauss (Table IX) as between the bookkeeping score on the one hand and the intelligence quotient and state examination marks (arithmetic) taken as a team on the other. For the intelligence quotient the Otis test was used, for the arithmetic the state examination mark and for bookkeeping achievement four Bowman and Percy tests. Records of 134 students in the ninth grade of the Roose-

velt Junior High School at New Brunswick, New Jersey were used. This correlation of .82 was the highest one determined by any research worker in this field as between any factor and any measure of bookkeeping achievement. Moreover, both factors and the measure of bookkeeping achievement were objective.

Work that has been done in correlating intelligence quotient and mental age with bookkeeping achievement indicated that the more reliable of the two factors was the intelligence quotient when three correlations between intelligence quotients and bookkeeping test scores had a central tendency in the very high fifties. This was found to be considerably higher than the correlations between arithmetic and bookkeeping test scores. More work is suggested in regard to these correlations, not necessarily inthe determining of the intelligence quotient but rather in further experimentation with the development of bookkeeping achievement tests as all those used for these correlations were objective but tested to a great extent theory and to a very little extent actual bookkeeping practice. Only when bookkeeping achievement in all of its aspects is tested can conclusive evidence be offered as to the reliability of the intelligence quotient as a factor in predicting pupil success in bookkeeping.

As stated above, the highest correlation found in any of the research works analyzed for this study was one of .82 as between a combined score of intelligence quotient and arithmetic

test result on the one hand and bookkeeping achievement as measured by Bowman and Percy tests on the other. This correlation is considered highly significant, so high that Hull states that such a correlation is not obtained by present studies.[1] This correlation is most interesting because it is such a highly significant one that there are indications that it might be widely used with great success in predicting bookkeeping achievement of pupils if it were to be proved in every situation to be approximately the same.

The reason for such a high correlation resulting from a combination of intelligence quotient and arithmetic when correlated with bookkeeping achievement may logically be that no one factor in itself is capable of serving as the sole trait or ability necessary for successful work in bookkeeping. It may indicate and probably does indicate that many factors are necessary to do successful work in bookkeeping. It seems to indicate that arithmetic alone, penmanship alone, industry alone, or any other trait or ability taken alone is not enough to do successful bookkeeping work. This may have been commonly believed by many but the above reviewed research seems to prove it. If this is so, research workers have been on the wrong track in searching for some one easily determined predictive factor for bookkeeping success.

To prove this assumption, more work is necessary to determine the correlations of bookkeeping success and combined in-

[1] Clark L. Hull, op. cit.

telligence quotient and arithmetic scores in many situations. Because of the great range in other types of correlations, it may well be that this one of .82 would prove to be the high one in a group with a range of .30 or .40 and with a central tendency much lower than .82. The fact that no other similar correlations have been determined renders any conclusions concerning it far from reliable. However, it points out the directions for further research.

CHAPTER VII

RELATIONSHIP OF APTITUDE TESTS TO BOOKKEEPING ACHIEVEMENT

Scores on various aptitude tests have been correlated with bookkeeping achievement as measured both by bookkeeping teacher grades and bookkeeping test scores. The Minnesota Vocational Test for Clerical Workers (two parts) by Andrews and Paterson, Quay's Bookkeeping Prognostic Test, The MacQuarrie Test of Mechanical Aptitude and the Thurstone Employment Test and various parts of the latter one have been correlated and these correlations are discussed here.

A summary of these correlations together with the research worker and the measure of bookkeeping achievement are as follows:

TABLE XIV. RELATIONSHIP OF #1 MINNESOTA CLERICAL TEST SCORES TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlation
Forsgard	Forsgard's Test	.015±.096

TABLE XV. RELATIONSHIP OF #2 MINNESOTA CLERICAL TEST SCORES TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlation
Forsgard	Forsgard's Test	-.192±.093

TABLE XVI. RELATIONSHIP OF QUAY'S PROGNOSTIC TEST SCORES TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlation
Quay	Quay's Achievement Test	.216

TABLE XVII. RELATIONSHIP OF MACQUARRIE MECHANICAL ABILITY TEST SCORES TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlation
Stedman	Carlson Bookkeeping Test	.176±.100

TABLE XVIII. RELATIONSHIP OF THURSTONE EMPLOYMENT TEST COMBINED SCORES TO BOOKKEEPING TEACHER GRADES

Investigator	Data	Correlation
Stedman		.568±.060

TABLE XIX. RELATIONSHIP OF THURSTONE EMPLOYMENT TEST MINUS #5 TO BOOKKEEPING TEACHER GRADES

Investigator	Data	Correlation
Stedman		.742±.045

TABLE XX. RELATIONSHIP OF THURSTONE EMPLOYMENT TEST MINUS #5 TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlation
Stedman	Carlson Bookkeeping Test	.730±.047

TABLE XXI. RELATIONSHIP OFTHURSTONE EMPLOYMENT TESTS 1, 4 AND 8 TO BOOKKEEPING TEACHER GRADES

Investigator	Data	Correlation
Stedman		.492±.077

TABLE XXII. RELATIONSHIP OF THURSTONE EMPLOYMENT TESTS 1, 4 AND 8 TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlation
Stedman	Carlson Bookkeeping Test	.560±.070

TABLE XXIII. RELATIONSHIP OF THURSTONE EMPLOYMENT TEST MINUS #5 COMBINED WITH ARITHMETIC TO BOOKKEEPING TEACHER GRADES

Investigator	Data	Correlation
Stedman		.710±.049

Only one of the tests shown in the above tables was found to be of any value in the solution of the problem.

Forsgard (Tables XIV and XV) found both parts of the Minnesota Vocational Test for Clerical Workers to have either a very low or a negative correlation with an objective bookkeeping achievement test, the author of which is not named. Part I of the above named test correlated .015±.096 with bookkeeping achievement while Part II correlated -.192±.093, both of which were of no significance in the solution of the problem. It must be pointed out, however, that to determine these correlations the test scores of only 49 pupils were used and little is known concerning the measure of bookkeeping achievement. It would

seem that the tests have very little bookkeeping prognostic value with correlations of .015±.096 (the probable error should be carefully noted) and -.192±.093, a minus correlation. Copies of the two parts of the Minnesota Vocational Test for Clerical Workers are included in Appendix B d of this thesis. An examination of these tests shows that they call for no more than a very simple checking of similar names and numbers from lists of 200 similar and dissimilar numbers and names. This is, without doubt, too unlike the abilities necessary for bookkeeping work to be a good prognostic test of bookkeeping ability.

Quay (Table XVI) developed his own prognostic test and his own achievement test. The prognostic test consisted of ten questions concerning simple transactions and the resulting changes in possession of cash or other article and the resulting change in net worth and capital. Two such sample questions may be found in Appendix A d. This was not a truly objective test in that it was preceded by oral teacher instructions which were different in many cases and omitted entirely in one case. The achievement test was objective but not standardized. Quay concludes that his coefficient of correlation of .216 was "too low to be of any real value," which seemed a correct conclusion.

Stedman (Table XVII) tested 75 children in the Bell High School in Los Angeles with the MacQuarrie Test of Mechanical Aptitude and Carlson's Bookkeeping Test of bookkeeping achievement. The correlation between these two tests was .176±.100

(the probable error should be noted) which was too low to be significant in this study. A copy of the MacQuarrie test is included in Appendix B b of this thesis. The low correlation is easily understandable as the MacQuarrie test is composed of dotting, tracing, copying, etc. tests which are rather different than the type of abilities necessary for bookkeeping work.

Stedman (Tables XVIII to XXIII, inclusive) had a great amount of success in using the records of the same children to correlate the Thurstone Employment Test and parts of it with either or both of bookkeeping teacher grades and scores on Carlson's Bookkeeping Test.

A copy of this test with key and directions is included in Appendix B c of this thesis. It contains sections on checking of arithmetic errors, incorrectly spelled words in paragraph form, drawing of lines through X's, Z's, U's and C's in lines of many letters, matching of letters and words, alphabetizing, checking various types of insurance policies by the numbers 1, 2 or 3, arithmetic problems and matching of Arabian and English proverbs.

Again it was wise to search out the correlations between this test and strictly objective test scores rather than depend on subjective teacher grades. The Thurstone test minus test #5 (alphabetizing) correlated .730±.047 with the Carlson Bookkeeping Test. This was a very high correlation and had great

value in the solution of the present problem. The combined scores of Thurstone tests #1 (checking), #4 (arithmetic) and #8 (code and proverbs) correlated .560±.070 with the Carlson Bookkeeping Test scores. These were the only scores derived from the Thurstone test which have been correlated with an objective bookkeeping achievement test and showed the great possibilities of the test as a prognostic factor of bookkeeping achievement.

The correlations that were found between various scores on the Thurstone test and bookkeeping teacher grades, although the latter were subjective, seemed to bear out the above two strictly objective correlations. With teacher grades the Thurstone combined score correlated .568±.060, the combined score minus #5 (alphabetizing) correlated .742±.045, the combined score of tests #1 (checking), #4 (arithmetic) and #8 (code and proverbs) correlated .492±.077 and the Thurstone combined score minus test #5 (alphabetizing) combined with arithmetic correlated .710±.049.

Thus, onthe basis of correlations between aptitude tests and bookkeeping achievement, the Minnesota Vocational Test for Clerical Workers, Quay's Prognostic Test and the MacQuarrie Test of Mechanical Aptitude were found to be of little value as prognostic factors of bookkeeping achievement. However, on the other hand, based on limited research carried on in one situation only, the Thurstone Employment Test showed great promise as a predictive factor of bookkeeping achievement. This statement is especially true of the combined Thurstone score minus test #5

which correlated .742±.045. This was the third highest correlation found in the study.

Because these correlations are so significant and yet are based on so few cases in only one school situation, further research along the same lines is recommended to determine if such high correlations exist in all or in most situations as between this test or parts of it and other standardized bookkeeping achievement tests.

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CHAPTER VIII

RELATIONSHIP OF MISCELLANEOUS SCHOOL SUBJECTS TO BOOKKEEPING ACHIEVEMENT

Many school subjects have been correlated with both bookkeeping teacher grades and bookkeeping test scores. Among them are freshman grade averages, typewriting, junior business training, junior business training combined with arithmetic, algebra, geography, history, composition, penmanship, reading literature, freshman English, spelling and grammar. A summary of the correlations of this material is presented below.

TABLE XXIV. RELATIONSHIP OF FRESHMAN AVERAGES TO BOOKKEEPING TEACHER GRADES

Investigators	Data	Correlations
Nelson	English, Algebra, Ancient History, Latin, Civics and General Science	.630±.025
Fitzpatrick	Regents in Biology, Commercial Arithmetic, Elementary Business Training and Test in English I	.229±.055

TABLE XXV. RELATIONSHIP OF FRESHMAN AVERAGES TO BOOKKEEPING TEST SCORES

Investigators	Data	Correlations
Sukovaty	English I, Biology, Commercial Arithmetic and Elementary Business Training and Regents	.409±.035
Fitzpatrick	English I, Biology, Commercial Arithmetic, Elementary Business Training and Regents	.407±.051

TABLE XXVI. RELATIONSHIP OF TYPEWRITING TO BOOKKEEPING TEACHER GRADES

Investigators	Data	Correlations
Stedman		.398±.106
Rosenblum		.282±.073

TABLE XXVII. RELATIONSHIP OF TYPEWRITING TO BOOKKEEPING TEST SCORES

Investigators	Data	Correlation
Rosenblum	Carlson Bookkeeping Test	.504±.059

TABLE XXVIII. RELATIONSHIP OF JUNIOR BUSINESS TRAINING TO BOOKKEEPING TEST SCORES

Investigators	Data	Correlations
Sukovaty	Regents and Regents	.147±.040
Fitzpatrick	Regents and Carlson Bookkeeping Test #3	.267±.056

TABLE XXIX. RELATIONSHIP OF JUNIOR BUSINESS TRAINING TO BOOKKEEPING TEACHER GRADES

Investigators	Data	Correlation
Fitzpatrick	Regents	.246±.054

TABLE XXX. RELATIONSHIP OF JUNIOR BUSINESS TRAINING AND ARITHMETIC COMBINED SCORES TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlation
Fitzpatrick	Regents and Regents and Carlson Bookkeeping Test #3	.399±.067

TABLE XXXI. RELATIONSHIP OF JUNIOR BUSINESS TRAINING AND ARITHMETIC COMBINED SCORES TO BOOKKEEPING TEACHER GRADES

Investigator	Data	Correlation
Fitzpatrick	Regents and Regents and Grades	.236±.054

TABLE XXXII. RELATIONSHIP OF FRESHMAN ALGEBRA TO BOOKKEEPING TEACHER GRADES

Investigator	Data	Correlation
Nelson	Grades	.590±.030

TABLE XXXIII. RELATIONSHIP OF GEOGRAPHY TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlation
Rosenblum	Grades and Carlson Bookkeeping Test	.540±.056

TABLE XXXIV. RELATIONSHIP OF GEOGRAPHY TO BOOKKEEPING TEACHER GRADES

Investigator	Data	Correlation
Rosenblum	Grades	.378±.071

TABLE XXXV. RELATIONSHIP OF HISTORY TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlation
Rosenblum	Grades and Carlson Bookkeeping Test	.492±.060

TABLE XXXVI. RELATIONSHIP OF HISTORY TO BOOKKEEPING TEACHER GRADES

Investigator	Data	Correlation
Rosenblum	Grades	.399±.067

TABLE XXXVII. RELATIONSHIP OF COMPOSITION TO BOOKKEEPING TEACHER GRADES

Investigator	Data	Correlation
Rosenblum		.368±.069

TABLE XXXVIII. RELATIONSHIP OF COMPOSITION TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlation
Rosenblum	Carlson Bookkeeping Test	.427±.064

TABLE XXXIX. RELATIONSHIP OF PENMANSHIP TO BOOKKEEPING TEACHER GRADES

Investigator	Data	Correlation
Rosenblum		.328±.071

TABLE XL. RELATIONSHIP OF PENMANSHIP TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlation
Rosenblum	Carlson Bookkeeping Test	.317±.071

TABLE XLI. RELATIONSHIP OF READING LITERATURE TO BOOKKEEPING TEACHER GRADES

Investigator	Data	Correlation
Rosenblum		.407±.067

TABLE XLII. RELATIONSHIP OF READING LITERATURE TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlation
Rosenblum	Carlson Bookkeeping Test	.474±.060

TABLE XLIII. RELATIONSHIP OF GRAMMAR TO BOOKKEEPING TEACHER GRADES

Investigator	Data	Correlation
Rosenblum		.371±.071

TABLE XLIV. RELATIONSHIP OF GRAMMAR TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlation
Rosenblum	Carlson Bookkeeping Test	.527±.057

TABLE XLV. RELATIONSHIP OF FRESHMAN ENGLISH GRADES TO BOOKKEEPING TEACHER GRADES

Investigator	Data	Correlation
Nelson		.480±.030

TABLE XLVI. RELATIONSHIP OF SPELLING TO BOOKKEEPING TEACHER GRADES

Investigator	Data	Correlation
Stedman		.295±.084

TABLE XLVII. RELATIONSHIP OF SPELLING TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlation
Stedman	Carlson Bookkeeping Test	.325±.081

The wide range of subjects that have been correlated with bookkeeping achievement showed a certain "hit or miss" attitude, a "trial and error" method of stabbing at this factor and that factor on the part of the research workers as a group in search of one remedy for the whole problem. They seemed to correlate anything at their disposal with bookkeeping achievement in the hope of finding the one prognostic factor that would solve the problem at once.

The one great limitation present in each one of this group of correlations is, of course, the subjective element of teacher judgment in grading pupils in each of the above subjects or group of subjects. The limitation is doubled in some of the correlations which made use of the bookkeeping teacher grades also. This must not be forgotten in considering the value of these correlations. For that reason only those correlations which were obtained with objective bookkeeping test scores were considered of value in the solution of this problem. Correlations of other subject grades with bookkeeping grades were considered altogether too subjective to be reliable. In some rare instance the correlation might be high enough to be significant for prognostic purposes but no conclusion might be drawn that would aid in the solution of this problem for many schools. As stated, however, all the correlations found in this study are presented in summary tables for the benefit of those who may wish to study them.

Sukovaty (Table XXV), after obtaining material from the records of 633 high school students at Albany, New York, combined the scores on New York State Regents examinations in Biology, Commercial Arithmetic and Elementary Business Training with a school examination in English I and found that they correlated with the Regents Bookkeeping Examination .409±.035.

Fitzpatrick (Table XXV) did similar work and found that the correlation was .407±.051, very consistent with Sukovaty's correlation. These correlations are neither high enough nor consistent enough because of changes in the Regents examinations from year to year to be of any great value in this study.

Rosenblum (Table XXVII) tested 70 pupils in the East New York Junior High School and found the correlation between typewriting teacher grades and Carlson's Bookkeeping Test #3 to be .504±.059. It must be remembered that this was only one correlation, that it had no further proof that it would be consistently high in many situations, that it was a subjective correlation, that many schools do not offer typewriting before bookkeeping and, therefore, could not obtain this grade. Because of these reasons further research on this factor is not recommended unless research on other factors fails to produce a satisfactory prognostic factor. In other words, other possible predictive factors show greater promise for further research than does typewriting after considering the above limitations.

Sukovaty (Table XXVIII) correlated the Regents examination scores of 633 pupils in Elementary Business Training with the Regents examination scores in bookkeeping and found the correlation to be .147±.040. Fitxpatrick (Table XXVIII) found the correlation between the Elementary Business Training Regents examination scores and Carlson's Bookkeeping Test #3 to be .267±.056. Both of these correlations are considered quite reliable as they are based entirely on objective tests. These correlations showed that Elementary Business Training has little significance or value as a prognostic factor of bookkeeping achievement.

Fitzpatrick (Table XXX) found a higher correlation to exist between a combined score of Elementary Business Training and Arithmetic as measured by Regents examinations and Carlson's Bookkeeping Test #3, one of .399±.067. This was too low to be significant or of any great value in the solution of our problem. It may further indicate, however, since the correlation was higher than Elementary Business Training and Bookkeeping alone, that Bookkeeping requires more than any one ability such as knowledge of Elementary Business Training but also a certain arithmetic ability. It may indicate that the best way to predict bookkeeping success or failure is not through any one factor but a combination of factors.

Using scores on the Carlson Bookkeeping Test, Rosenblum has correlated them with many school subjects. He found that

they correlated with geography teacher grades .540±.056 (Table XXXIII), with history grades .492±.060 (Table XXXV), with composition .427±.064(Table XXXVIII), with penmanship .317±.071 (Table XL), with reading literature grades .474±.060 (Table XLII) and with grammar grades .527±.057 (Table XLIV). Some of these correlations were high enough to warrant further study but their value for adoption by other schools at the present time were not considered wise because of the limited research that has been done on them and because of the subjective element present in all the teacher grades. Because of these reasons it was difficult to draw any satisfactory conclusions beyond the fact that some school subjects showed promise for future research.

Stedman (Table XLVII) found the correlation between spelling grades and the scores on the Carlson Bookkeeping Test to be .325±.081, too low to be of significance in the solution of the problem.

The subjects which correlated highest with objective bookkeeping achievement tests were typewriting .504±.059, geography .540±.056, history .492±.060 and grammar .527±.057.

In conclusion, it may be stated concerning various school subjects that the value of them as factors in bookkeeping prognosis is limited by the subjective element of teacher grades but that certain correlations were sufficiently high to warrant fur-

ther study based on objective examinations in those certain subjects. It was indicated that some combination of objective scores in these subjects may be a more successful predictive factor than the score or a grade in some one of these subjects.

CHAPTER IX

RELATIONSHIP OF MISCELLANEOUS FACTORS TO BOOKKEEPING ACHIEVEMENT

Miscellaneous factors that have been correlated with bookkeeping achievement include personal traits, chronological age, English - Recognition, English - Usage and reading ability. Summary tables of these correlations are presented below.

TABLE XLVIII. RELATIONSHIP OF PERSONAL TRAITS TO BOOKKEEPING TEACHER GRADES

Investigator	Data	Correlations
O'Brien	Accuracy	.557±.034
	Industry	.586±.032
	Perseverance	.492±.037
	Initiative	.505±.037
	Neatness	.505±.037
	Total Estimate	.502±.037

TABLE IXL. RELATIONSHIP OF PERSONAL TRAITS TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlations
O'Brien	Accuracy - Elwell-Fowlkes	.560±.034
	Industry - " - "	.440±.040
	Perseverance - " - "	.442±.039
	Initiative - " - "	.563±.033
	Neatness - " - "	.436±.040
	Total Estimate- " - "	.550±.034

TABLE L. RELATIONSHIP OF CHRONOLOGICAL AGES TO BOOKKEEPING TEACHER GRADES

Investigator	Data	Correlation
Nelson		-.190±.040

TABLE LI. RELATIONSHIP OF CHRONOLOGICAL AGES TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlation
Rosenblum	Carlson Bookkeeping Test	-.468±.062

TABLE LII. RELATIONSHIP OF ENGLISH - RECOGNITION TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlation
Forsgard	Minneapolis Classification Test and Forsgard Achievement Test	.216±.095

TABLE LIII. RELATIONSHIP OF ENGLISH - USAGE TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlation
Forsgard	Minneapolis English Classification Test and Forsgard Achievement Test	.164±.096

TABLE LIV. RELATIONSHIP OF READING ABILITY TO BOOKKEEPING TEST SCORES

Investigator	Data	Correlation
O'Brien	Iowa Silent Reading Test and Elwell-Fowlkes Bookkeeping Test	
	Paragraph Meaning	.341±.043
	Word Meaning	.404±.041
	Sentence Meaning	.293±.045
	Location of Information	.311±.044

O'Brien (Table IXL) had the Bookkeeping II teachers rank 191 pupils in a large senior high school on the basis of accuracy, industry, perseverance, initiative and neatness. The pupils were ranked 1 to 5 on each trait, such as on accuracy as follows:

5 - extremely accurate
4 - high degree of accuracy
3 - moderate degree of accuracy
2 - inexact - somewhat careless
1 - slovenly

The bases on which the other traits were ranked may be found in Appendix A f. These rankings were correlated with the Elwell-Fowlkes Bookkeeping Test and the correlations were found to be as follows:

Accuracy -	.560±.034
Industry -	.440±.040
Perseverance -	.442±.039
Initiative -	.563±.033
Neatness -	.436±.040
Combined or total estimate -	.550±.034

These rankings were based on teacher judgment and thus their value was limited. The correlations, especially the total estimate one, were high enough to indicate that these traits, although based on teacher judgment, are significant and that a scientifically constructed rating scale for some such factors as these combined with other factors may be the answer to the problem.

Certainly this factor alone is not sufficient to predict bookkeeping achievement because many other studies (for example,

Stedman's [1]) have indicated that a child with a low intelligence quotient stands little chance of passing bookkeeping. A student might well be accurate, industrious, neat, etc. and yet not have the native ability to do the work. These correlations were high enough, however, to indicate that even though a person has a high intelligence quotient he cannot do satisfactory bookkeeping work if he is not accurate, industrious, neat, etc. Thus, although they referred to subjective factors, the correlations were sufficiently high to demand further research as partial factors in bookkeeping prognosis. When correlated with bookkeeping teacher grades (Table XLVIII), these traits correlated consistently as high as when correlated with the Elwell-Fowlkes Bookkeeping Test.

Nelson (Table L) and Rosenblum (Table LI) have correlated chronological age with bookkeeping teacher grades and Carlson's Bookkeeping test scores. In both cases the correlations were negative, indicating no value whatsoever in the solution of the problem.

Forsgard (Tables LII and LIII) tested 49 pupils and correlated English - Recognition and English - Usage with bookkeeping by using the Minneapolis English Classification Test and an objective bookkeeping achievement test and found these correla-

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[1]Melissa B. Stedman, "Factors Influencing School Success in Bookkeeping", Journal of Applied Psychology, XIV (February, 1930), pp. 74-82.

tions to be .216±.095 and .164±.096, respectively, both too low to be of any value here.

O'Brien (Table LIV) found the correlations between various parts of the Iowa Silent Reading Test and Elwell-Fowlkes Bookkeeping Test to be as follows: Paragraph Meaning .341±.043, Word Meaning .404±.041, Sentence Meaning .293±.045, Location of Information .311±.044. Other parts of the test were considered by him to be too low to be of any value. Even the highest ones which were given here were not high enough to be significant.

Of these miscellaneous factors, then, only O'Brien's personal traits are of value for future consideration. They were sufficiently high to indicate a fairly close relationship with bookkeeping achievement. O'Brien's was the only study which attempted to correlate and determine the relationship of subjective traits such as accuracy, neatness, industry, etc. with bookkeeping achievement and it indicates that such traits are definitely necessary for successful bookkeeping work. Further research is recommended in this direction but going a step further in combining these ratings with other factors such as arithmetic ability, reasoning ability, penmanship and other more objective abilities thought necessary for bookkeeping work to determine if the combination of all these factors may not be the solution to the problem.

CHAPTER X

WHITMAN (MASSACHUSETTS) HIGH SCHOOL DATA

Following is presented material obtained from the results of experimental work along the lines of prediction of bookkeeping success at Whitman High School during the years from 1937 to 1941, inclusive.

To fully appreciate this material, it seems advisable to describe briefly the school and the work pertaining to the problem under discussion that has been done there. The town might be termed a rural, manufacturing town of 7,600 persons. The four-year high school has a school population that varies from 550 to 600 pupils, including tuition pupils from two nearby towns.

In the ninth grade or freshman year, the only commercial subject offered is Junior Business Training. Its enrollment varies from 110 to 120 pupils and forms four classes. Other freshman subjects taken by the future commercial students include English I and Physical Education which are required and Citizenship, Cooking, Ancient History, General Science, any two of which may be elected. In the tenth grade or sophomore year in the commercial course, English II, Bookkeeping I, Commercial Geography and Physical Education are required and Stenography and Typewriting I, Cooking II, Medieval and Modern History, French I and Algebra I are elective. A complete program of

study for Whitman High School is included in Appendix B a.

For the past four years the Bookkeeping I course has been divided into Bookkeeping IA (Vocational) and Bookkeeping IB (Clerical). On the basis of abilities, interests and aptitudes, students have been chosen for Bookkeeping IA, in which course they must receive a grade of A or B or have the approval of the bookkeeping teacher to be recommended for Bookkeeping II. The same is true of their success in Bookkeeping II in order to be recommended for Bookkeeping III. In this way it is desired to limit the number of bookkeeping majors to those particularly qualified for the work and to a number small enough so that most or all of them will be employed in the vicinity as full-time or part-time bookkeepers. Bookkeeping IB is a one-year course devoted to a study of the bookkeeping cycle and the personal and clerical aspects of bookkeeping. Transfers from Bookkeeping IA to Bookkeeping IB and vice versa are made up to the end of the first eight-week ranking or marking period in order to correct errors in the selection of students for these two courses. These transfers do not number more than four or five annually.

In the past the selection of vocational bookkeeping pupils has been made primarily on the basis of an arithmetic test score and freshman grades. The recommendations of the junior business training teacher have decided border-line cases.

Their bookkeeping success or measure of bookkeeping

achievement has been twofold, bookkeeping teacher grades and the Elwell-Fowlkes Bookkeeping Test. The same bookkeeping teacher has taught vocational bookkeeping for the past four years. This year a Cooperative standard examination of the speed and level of comprehension of reading was given to many of the students. Thus, for most of the members of the last three vocational bookkeeping classes there are available on the one hand, arithmetic test scores, freshman grades and scores on tests of the speed and level of comprehension of reading and, on the other hand, vocational bookkeeping teacher grades and scores on the Elwell-Fowlkes Bookkeeping Test. Each of the above first named factors and combinations of them have been correlated with each of the measures of bookkeeping achievement in the second group in an attempt to determine some factor or factors that satisfactorily predict success in vocational bookkeeping in the given situation at Whitman (Massachusetts) High School. It was hoped that these correlations would indicate a factor or combination of factors that would be useful in other situations or schools.

It will be noted that the total number of students available for correlation in each case differs from the numbers available for correlation in the other cases. This is so because only the records of pupils with reasonably like characteristics and background for each correlation were used. By that is meant that almost all were sophomores, none had previous

bookkeeping courses, almost all had junior business training or similar background, their educational backgrounds were for the most part obtained in Whitman schools, the most recent transfers being eliminated. And yet, just as many cases as possible were used for each correlation. For example, several students had not taken the arithmetic test because of absence but were allowed to take vocational bookkeeping because their freshman grades were very satisfactory and several others did not take the arithmetic test but later took vocational bookkeeping because their parents so insisted. Freshman grades but not arithmetic scores were available for such cases. However, they were considered in the freshman grade correlations but not in t he arithmetic score correlations because one of the above groups seemed to offset the other group. In one case the freshman grades were not available because the office life card could not be located but the arithmetic test score was available and was used. Such conditions explain the slight differences in the totals available for the various correlations.

The first correlation was determined between a freshman grade index and the Elwell-Fowlkes Bookkeeping Test. Freshman subjects taken by the vocational bookkeeping students include Junior Business Training, English I, Physical Education, Citizenship, Cooking, Ancient History and General Science. Cooking and Physical Education grades were excluded from the present consideration because those subjects were not thought to be

closely enough connected with vocational bookkeeping in subject matter or presentation to be relevant. A freshman grade index was formed by a consideration of all the other subjects.

There is a five-point marking system composed of A's, B's, C's, C-'s and D's. C- or 70 is the lowest passing grade. A value of five was given to A's, four to B's, three to C's, two to C-'s and one to D's. The individual values were added and the total that was thus obtained was divided by the number of subjects considered. Thus, four C's would total twelve, divided by four subjects would result in an index of three; two C's and two B's would total fourteen, giving an index of three and a half.

A copy of the Elwell-Fowlkes Bookkeeping Test with which this freshman index was correlated may be found in Appendix B g.

On the following page is the scatter diagram used to arrive at this correlation. The correlation was .390±.051.

This correlation compares well with similar ones found by Sukovaty (Table XXV) .409±.035 and by Fitzpatrick (Table XXV) .407±.051. The value of this correlation is limited because of the subjective element of teacher grades. It is believed, however, that these grades do show a certain attitude toward school work as judged by the teacher and therefore may have a great value in further research on the subject if a combination of factors proves to be best to predict bookkeeping achievement.

TABLE LV. WHITMAN CORRELATION: FRESHMAN GRADE INDICES AND ELWELL-FOWLKES BOOKKEEPING TEST SCORES

		Elwell-Fowlkes Bookkeeping Test Scores													
		55-	58-	61-	64-	67-	70-	73-	76-	79-	82-	85-	88-	91-	94-	
Freshman Grade Indices	5													1	1	2
	4¾										1	1				2
	4½											1	2	1	1	5
	4¼						1	1		2	1	1		1		7
	4				1	1	1		3	2		3	1	2		14
	3¾								1	2	1		1	1		6
	3½	1				4	1	3	1	4	2	4	1	2		23
	3¼				5	1	4	3	3	3	2	1	2	3	1	28
	3	1	1	1	2		3	4		5		1				18
	2¾				1			1	1		1	1				5
	2½		1		2	2					3			1		9
	2¼				1					1	1					3
	2															0
	1¾							1								1
		2	2	1	12	8	10	13	9	19	12	13	7	12	3	123

$r = .390 \pm .051$

The second correlation determined was between an arithmetic test composed by the vocational bookkeeping teachers in the writer's school and the same Elwell-Fowlkes Bookkeeping Test.

A copy of the arithmetic test is in Appendix B f. The intention of those who constructed it was that it should contain as nearly as possible and in the same proportions as needed in vocational bookkeeping the fundamental processes of arithmetic and reasoning problems. The types of problems and the credit given them in the scoring are as follows:

TABLE LVI. COMPOSITION OF WHITMAN ARITHMETIC TEST

Number and Type of Problem	Credit for Each Problem	Total Credit
4 Addition	7	28
2 Subtraction	3	6
2 Multiplication of per cent	3	6
2 Changing of decimals to fractions	1	2
6 Bookkeeping equation problems	3	18
5 Reasoning problems	8	40
21		100

The correlation between this arithmetic test and the Elwell-Fowlkes Bookkeeping Test for 126 students was .370±.052. The scatter diagram used to determine this correlation is presented on the second following page.

Both the arithmetic test and the Elwell-Fowlkes Bookkeeping Test are objective. It must be noted, however, that the arithmetic test has not been scientifically constructed but rather based on the judgment of experienced teachers as explained

above. Moreover the questions have been weighted as indicated above by the same teachers in order to give more credit to such problems as addition and reasoning because those types of work are more common in bookkeeping work than is such a problem as finding a percentage of a number, although such a problem is encountered occasionally.

This correlation compares well with similar correlations between objective arithmetic tests and bookkeeping tests of .510±.043, .404±.041 and .389.±052 (Table V). These correlations have a central tendency in the lower forties and indicate that at present they are of no great value as a prognostic factor but that they have possibilities for further research and development.

TABLE LVII. WHITMAN CORRELATION: ARITHMETIC TEST SCORES AND ELWELL-FOWLKES BOOKKEEPING TEST SCORES

		Elwell-Fowlkes Bookkeeping Test Scores											
		54-	58-	62-	66-	70-	74-	78-	82-	86-	90-	94-	
Arithmetic Test Scores	95-			1		1	2		1	1	4		10
	90-				1		2	2	4	3	1	1	14
	85-			2	1		2	6	2	3	3	1	20
	80-	1				1	1	8	1	1	5		18
	75-	1	1		1	1	4		4	2		1	15
	70-		2	1	5	4	1	2	2	1	1		19
	65-			2	1	3	1	1	2	1			11
	60-		1	1	1		1	1	1	1	1		8
	55-			1	1		1	1	1				5
	50-				1	1							2
	45-					1		1					2
	40-	1					1						2
		3	4	8	12	12	16	22	18	13	15	3	126

$r = .370 \pm .052$

The third correlation determined was between the same freshman grade indices previously described and the vocational bookkeeping teacher grades. The same teacher has taught all pupils whose cases are considered over the three-year period and the standards of achievement, the methods of grading, etc. of that teacher have been rather consistent.

The fact that such grades are subjective, however, cannot be overlooked. Individual teachers have their own ideas as to how much of the final grade should be determined by test scores, penmanship, industry, etc. For that individual teacher, however, the correlation has value and simply because it is a subjective grade does not wholly destroy its value for others.

The correlation found was .473±.047. The scatter diagram of this correlation is on the following page. There is no other correlation with which this one can be satisfactorily compared.

TABLE LVIII. WHITMAN CORRELATION: FRESHMAN GRADE INDICES AND BOOKKEEPING TEACHER GRADES

Freshman Grade Indices	Bookkeeping Teacher Grades														
	44-	48-	52-	56-	60-	64-	68-	72-	76-	80-	84-	88-	92-	96-	
5-												1	1		2
4¾-												1		1	2
4½-									1	1	1	2			5
4¼-							1	1	2	1	1		1		7
4-							1	4	2	3	3		1		14
3¾-							1	1	2		2				6
3½-		1	1	1		3	2	1	6	4	2	2			23
3¼-					3	2	5	8	3	5	2	1			29
3-	1			1	1	3	2	6		3					17
2¾-		1					1		2	1					5
2½-			1			1	2	3			1	1			9
2¼-					1		1		1						3
2-															0
1¾-			1												1
	1	2	3	2	5	9	16	24	19	18	12	8	3	1	123

$r = .473 \pm .047$

The fourth correlation was found between the arithmetic test scores and the vocational bookkeeping teacher grades. Both of these have been discussed rather thoroughly on the few preceding pages and no further discussion is necessary here.

The correlation was .342±.050 and the scatter diagram used is on the following page. This correlation is too low to be of any great significance which may partially be explained by the possibly unreliable and invalid arithmetic test and the subjective bookkeeping teacher grades.

TABLE LIX. WHITMAN CORRELATION: ARITHMETIC TEST SCORES AND BOOKKEEPING TEACHER GRADES

		Bookkeeping Teacher Grades												
		35-	40-	45-	50-	55-	60-	65-	70-	75-	80-	85-	90-	
Arithmetic Test Scores	95-								2	3	3	1	2	11
	90-				1			3	2	3	1	4	3	17
	85-					1	2	1	3	2	6	4	2	21
	80-			1			1	1	4	5	3	3	2	20
	75-				1	1	2	2	3	4	3	3		19
	70-					2	1	3	6	6	3	1		22
	65-		1				1	2	3	1	3	2		13
	60-	1							4	1	1	1		8
	55-				1				1	3				5
	50-			1					1					2
	45-						1	1						2
	40-						1							1
		1	1	2	3	4	9	13	29	28	23	19	9	141

$r = .342 \pm .050$

Assuming that freshman grades indicate to a certain extent a pupil's attitude toward and interest in school subjects and work and that the arithmetic test score indicates to a certain extent a pupil's ability to do the type of work necessary for vocational bookkeeping work, these two items or factors have been combined and correlated with, first, the vocational bookkeeping teacher grades and, second, the Elwell-Fowlkes Bookkeeping Test scores.

What will hereafter be referred to as a combined index was derived by weighting equally the freshman grade index and the arithmetic score (both previously described) as follows: the average of the freshman grade multiplied times twenty and of the arithmetic test score.

The freshman grade index, previously described with A's having a value of five, B's one of four, etc., had a possible high index of five (that is, all A's). As the arithmetic test had a possible one hundred points the freshman index was multiplied by twenty to give it a possible high of one hundred also. This is the same as giving A's a value of 100, B's a value of 80, C's one of 60, C-'s one of 40 and D's one of 20 and dividing the total by the number of grades considered. The result when averaged with the arithmetic score gives the combined index.

The method of arriving at the so-called combined index cannot be scientifically justified. It was felt that one's arith-

metic ability was as important as one's attitude toward school work and general school ability as shown by the freshman grades. This was an assumption in the hope that the correlation would be sufficiently high to show that the combined index of arithmetic and general freshman grades is significant as a prognostic factor of bookkeeping success or failure.

Correlations thus determined were as follows:

Combined Index and Elwell-Fowlkes Bookkeeping Test - .312±.056

Combined Index and Bookkeeping Teacher Grades- - - - .498±.046.

The scatter diagrams for these correlations are shown on the two following pages.

The fairly great difference between these two correlations could not be accounted for or easily explained. The correlation between the combined index and the objective Elwell-Fowlkes Bookkeeping Test was too low to be significant and the one between the combined index and the teacher grades was of little value because of the subjective element of the latter. The much higher correlation between the combined index and the bookkeeping teacher grades may be accounted for by the fact that teacher judgment entered into both the prognostic factor and the measure of bookkeeping achievement.

TABLE LX. WHITMAN CORRELATION: COMBINED INDICES AND ELWELL-FOWLKES BOOKKEEPING TEST SCORES

Combined Indices	Elwell-Fowlkes Bookkeeping Test Scores														
	55-	58-	61-	64-	67-	70-	73-	76-	79-	82-	85-	88-	91-	94-	
95-										1			1	1	3
90-											1	1			2
85-						2		1				1	2	1	7
80-							1	3	6	1	4	2	3		20
75-				1	1		2	3	2	1	2		2		14
70-	1			3	4	1	2		5	4	5	2		1	28
65-		1	1	2	1	3	2		3	2			1		16
60-		1		1		3	3	1	3	2	1		2		17
55-	1			3	2	1	1								8
50-										1					1
45-															0
40-															0
35-							1								1
	2	2	1	10	8	10	12	8	19	12	13	6	11	3	117

$r = .312 \pm .056$

TABLE LXI. WHITMAN CORRELATION: COMBINED INDICES AND BOOKKEEPING TEACHER GRADES

Combined Indices	Bookkeeping Teacher Grades														
	40-	44-	48-	52-	56-	60-	64-	68-	72-	76-	80-	84-	88-	92-	
95-													2	1	3
90-										1	1				2
85-									3			1	2	1	7
80-				1				4	1	6	2	4	1	1	20
75-						1	1		2	2	5	2	1		14
70-		1			1		3	2	7	3	6	3	2		28
65-					1	2	2	5	1	2	2	1			16
60-	1		1	1		1	2	1	6	3		1			17
55-			1			1	1	3	1	1					8
50-										1					1
45-															0
40-															0
35-				1											1
	1	1	2	3	2	5	9	15	21	19	16	12	8	3	117

$r = .498 \pm .046$

Available for thirty-five members of the class of 1942 who took vocational bookkeeping were the scores for the speed and level of comprehension of reading as tested by the Cooperative English Test, Test CI; Reading Comprehension - lower level - From Q, published by the Cooperative Test Service. A copy of this test is in the Appendix B e.

These have been correlated with both the vocational bookkeeping teacher grades and the Elwell-Fowlkes Bookkeeping Test, both previously described.

The coefficient of correlation of the reading comprehension test and the bookkeeping teacher grades was .219±.109.

The coefficient of correlation of the reading comprehension test and the Elwell-Fowlkes Bookkeeping Test was .346±.089.

The scatter diagrams for these two correlations are on the following two pages. Both of these correlations are too low to be significant.

These might be compared to the investigation by Forsgard concerning the correlation between the Minneapolis English Classification Test and Forsgard's achievement test in bookkeeping. Those two correlations were .216±.095 (Table LII) and .164±.096 (Table LIII). These also were too low to be significant.

TABLE LXII. WHITMAN CORRELATION: READING COMPREHENSION SCORES AND BOOKKEEPING TEACHER GRADES

Reading Comprehension Scores		Bookkeeping Teacher Grades												
		44-	48-	52-	56-	60-	64-	68-	72-	76-	80-	84-	88-	
	132-								2					2
	127-							1						1
	122-											1	1	2
	117-						1	1				1		3
	112-						1		1					2
	107-							1	1				1	3
	102-							1		2		1	1	5
	97-										1			1
	92-					1		1	1		1			4
	87-	1						2	1			1		5
	82-					1		1	1	1				4
	77-										1			1
	72-						1		1					2
		1	0	0	0	2	3	8	8	3	3	4	3	35

$r = .219 \pm .109$

TABLE LXIII. WHITMAN CORRELATION: READING COMPREHENSION SCORES AND ELWELL-FOWLKES BOOKKEEPING TEST SCORES

Reading Comprehension Scores	Elwell-Fowlkes Bookkeeping Test Scores														
	55-	58-	61-	64-	67-	70-	73-	76-	79-	82-	85-	88-	91-	94-	
132-						2									2
127-									1						1
122-										1		1			2
117-							1				1	1			3
112-					1		1								2
107-									2		1				3
102-				1	1				1			1		1	5
97-										1					1
92-			1	1					2						4
87-	1				1			2					1		5
82-				1		2		1							4
77-						1									1
72-				1			1								2
	1	0	1	4	3	5	3	3	6	2	2	3	1	1	35

$r = .346 \pm .089$

Below is a summary of the correlations determined for Whitman (Massachusetts) High School on the basis of material available there.

TABLE LXIV. SUMMARY OF DATA FROM WHITMAN HIGH SCHOOL

Prognostic Factor	Measure of Achievement	Correlation
Freshman Index	Elwell-Fowlkes Bookkeeping Test	.390±.051
Freshman Index	Bookkeeping Teacher Grade	.473±.047
Arithmetic Test Score	Elwell-Fowlkes Bookkeeping Test	.370±.052
Arithmetic Test Score	Bookkeeping Teacher Grade	.342±.050
Combined Index	Elwell-Fowlkes Bookkeeping Test	.312±.056
Combined Index	Bookkeeping Teacher Grade	.498±.046
Reading Comprehension	Elwell-Fowlkes Bookkeeping Test	.346±.089
Reading Comprehension	Bookkeeping Teacher Grade	.219±.109

It may be concluded that for the high school at Whitman the freshman average or freshman grade index correlates most highly and most consistently with bookkeeping success as measured by bookkeeping teacher grades (.473±.047 - Table LVIII) and as measured by the Elwell-Fowlkes Bookkeeping Test (.390±.051 - Table LV). Arithmetic cannot be overlooked or disregarded because the correlation between arithmetic as measured by an objective test and bookkeeping are almost as high as those of the freshman grade indices.

Whitman should continue to use for future selection of vocational bookkeeping students the freshman average aided by the

arithmetic test scores.

On the basis of the above correlations it is not wise to set a definite arithmetic score or a freshman grade index that a student must attain in order to be selected for vocational bookkeeping. The correlations do not justify such a conclusion. An arithmetic test score of approximately 65 and a freshman grade index of approximately 3 generally are the minima to be obtained by future vocational bookkeeping students.

For this school it is recommended that further effort be made to obtain a better method for predicting bookkeeping success of pupils. The present correlations are satisfactory until a better method or factor is determined as the errors made can be corrected as described previously in this chapter and in Chapter XII.

CHAPTER XI

CONCLUSIONS

Previously, in Chapter IV, there have been discussed the limitations of the correlations determined by various writers on the subject that reveal the weaknesses of the work that has been done on bookkeeping prognosis. These are of the utmost importance because they very definitely limit the reliability of the conclusions which can be drawn from them.

If we are to accept the opinions of writers concerning the value of correlations for prognostic purposes, the statement should be repeated that unless a coefficient of correlation is in the middle or high positive sixties or higher we cannot actually rely on it to any great extent. Other positive correlations are relevant to this study but of too little value to be significant for prognosis. One writer states that a correlation be low .50 is "practically useless for prognosis"[1] while a second author states that "for purposes of prognosis .... a correlation of .50 is very low indeed"[2].

On these bases, what does an analysis of the conclusions that have been drawn in the past six chapters on the relationship of various types of factors to bookkeeping achievement

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[1]Clark L. Hull, op. cit.

[2]Arthur S. Otis, op. cit.

show?

1. Because of a tremendous overenrollment in vocational bookkeeping, there is need for the selection of vocational bookkeeping students.

2. Better guidance, the advantages of homogeneous grouping and the reduction of failures can be accomplished if such a selection of students is made which makes the practice of the selection of vocational bookkeeping students definitely advisable.

3. Arithmetic is not reliable enough as a predictive factor to be relied upon wholly in selecting pupils for vocational bookkeeping classes. However, the correlations are sufficiently high to justify further research.

4. On the whole, intelligence quotient has a higher correlation with bookkeeping achievement than does arithmetic or mental age and indicates possible great value for prognostic purposes. The highest correlation found was one of .82[1] as between intelligence quotient and arithmetic combined on one hand and bookkeeping achievement on the other hand. This indicates that probably no one factor is as good as a combination of factors for prognostic purposes in such a subject as bookkeeping which demands more than one skill or ability or trait.

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[1]Harold W. Strauss, op. cit.

5. Of the aptitude tests that were correlated with bookkeeping achievement, none correlated as highlyand consistently as the whole and various parts of the Thurstone Employment Test in Clerical Work. Moreover, as a whole, these Thurstone correlations were more significant than any other factor considered in this study.

6. Of the grades in the many school subjects correlated with bookkeeping test scores, those in typewriting, geography, history and grammar (all in single instances) correlated highest but not high enough to overcome the weakness of the subjective element entering into the determination of these grades; therefore, their value for prognostic purposes is doubtful.

7. At Whitman (Massachusetts) High School, administrators should use the freshman grade index and arithmetic test score for prognostic purposes until some better factor or factors are found. A decided effort should be made to find such factor or factors, as the factors used at present do not correlate sufficiently high with bookkeeping achievement for complete reliability. They are satisfactory, however, as the errors made can be corrected.

CHAPTER XII

RECOMMENDATIONS

Based on this study, there are two general recommendations that can be made. One concerns how each individual school can treat this problem of selection of vocational bookkeeping students. The second concerns further research on the problem of finding a satisfactory method for predicting bookkeeping pupil achievement.

In the first two chapters of this thesis the need for and the advisability of the selection of vocational bookkeeping students were definitely shown. Because there is so great a need for this selection to be carried out, it is recommended that each school adopt such a system of selection of vocational bookkeeping students. Although there is no factor or group of factors which at present correlate highly enough with an objective measure of bookkeeping achievement to enable this selection to be carried out without error, in every school there are factors which may be used experimentally until the best one is found. The Thurstone Employment Test and the intelligence quotient are suggested as having great possibilities on the basis of this study. It is thought that they will correlate highly enough with bookkeeping achievement to make possible this selection with few errors. Errors in selection, however, will always be made until some factor is found that correlates

perfectly with bookkeeping achievement and at present the possibility of finding such a factor is indeed remote.

The principle of the selection of vocational bookkeeping students will prove most satisfactory if some method of correcting these mistakes can be found. The following is a workable method of correcting these errors.

Many schools have recognized the values of bookkeeping for all commercial- and general-course students. It is not within the scope of this thesis to delve into that topic, to discuss the values of bookkeeping for all, to discuss the content of such a course, etc. If such is recognized, however, and the school has sufficient first-year bookkeeping students to justify two classes in that subject, selection can be made and the mistakes nearly always corrected.

The two classes (possibly called vocational and personal or clerical bookkeeping) can be scheduled to meet the same period and after six or eight weeks of study the students who are not meeting the standards set for the vocational bookkeeping class can be transferred to the personal or clerical group. Transfers can likewise be made from the latter group to the former group if those students show that they can meet the vocational class standards. If it is not possible to have these two classes meet the same period each day, transfers are still usually possible. Most of these students are taking the same

English, geography, physical education or some other subject and the transfer can be made by transferring them from one bookkeeping to another bookkeeping class and from one English, geography, physical education, etc. to another English, geography, or physical education section. Because selection is so desirable and because mistakes will be made, such a method of correcting selection errors is administratively wise and possible in most schools.

The second recommendation concerns the further research in regard to the solution of the problem of finding satisfactory prognostic factors to be used as the basis for the selection of vocational bookkeeping students. Further research is needed in the individual fields of arithmetic, intelligence quotient, the Thurstone Employment Test and personal traits as these show the greatest promise at the present time. But the most important problem for research at present is of a slightly different nature, that of determining the relationship of a combination of factors and bookkeeping achievement. The reasons for arriving at this recommendation are developed below.

It must be pointed out that the following recommendations are based only on isolated cases and indicate types of factors that, because of high correlations in at least one or several cases, allow tentative conclusions and recommendations to be made.

The factors found in this study which correlate with bookkeeping achievement in the middle or high positive sixties or higher are as follows:

1. There is a single correlation (highest found) of .82 as between a combination of Otis intelligence quotient and the New Jersey State Arithmetic Examination and Bowman and Percy bookkeeping test score (Table IX).

2. The next highest correlation is .770±.024 as between Otis intelligence quotient and Bowman and Percy test score (Table XII). However, other Otis intelligence quotients correlate with Elwell-Fowlkes and Forsgard tests, .472±. 038 and .5487±.0746, respectively (Table XII).

3. The third highest correlation is a single one of .742±.045 between the Thurstone Employment Test minus #5 and bookkeeping teacher grades (Table XIX).

4. The fourth highest correlation is a single one between the Thurstone Employment Test minus #5 and Carlson's Bookkeeping Test score of .730±.047 (Table XX).

5. The fifth highest correlation is a single one of .710±.049 between the Thurstone Employment test minus test #5 combined with arithmetic and bookkeeping teacher grades (Table XXIII).

6. The sixth highest one is .648±.057 between mental age (Terman) and Carlson's Bookkeeping Test (Table XIII). Three other similar correlations range from .227±.059 to .606±.031 (Table XIII).

The above are the only six correlations above positive .64. Two of them, the second and the sixth, are offset by similarly determined ones of much lower correlations. Three of them, the third, fourth and fifth, are all determined by Stedman and are based on the Thurstone Employment Test. The sixth one is based on a combination of intelligence quotient and arithmetic test score.

On the basis of these highest correlations, the Thurstone Employment Test minus test #5 seems to have great value in predicting bookkeeping pupil success whether it is used alone or combined with arithmetic and whether it is correlated with the Carlson Bookkeeping Test or with bookkeeping teacher grades. Intelligence quotient combined with arithmetic correlates highly with bookkeeping achievement as indicated by Bowman and Percy tests.

Without exception, each of the six correlations above .64 is a combination of one or more factors, such as intelligence quotient and arithmetic and the Thurstone tests, taken alone or combined with arithmetic. The Thurstone test is composed of individual tests testing arithmetic, checking, code, etc. as the intelligence tests likewise consider more than one factor. It may be concluded that all six consider more than one factor. This probably indicates that some one factor such as arithmetic alone, industry alone, penmanship alone, etc. is

not enough and that many factors are necessary to do successful work in bookkeeping. If this is so, research workers have been on the wrong track in searching for some one easily determined predictive factor for bookkeeping success.

Bookkeeping is a job to be done. It is different than many other jobs. There must be certain qualifications necessary to do the job successfully as there are for any job. And if they are present they should be found. Further research is needed to determine just what are the many factors necessary for bookkeeping success and to what extent they are necessary as compared with the other factors.

A suggested method to find these factors would be to question several hundred competent bookkeeping teachers and other experts in the field of bookkeeping as to what factors they believe are necessary for successful bookkeeping classwork and as to how they would rate them according to importance. These would include probably intelligence, arithmetic of the bookkeeping type, industry, penmanship, school attitude, accuracy, etc. On this basis a comprehensive test might be composed combining the various factors according to their believed importance for bookkeeping achievement. The work done on this thesis indicates so strongly that such a test might be the answer, if there is an answer, to this prognostic problem that the development of it would be a decidedly worthwhile contribu-

tion to secondary commercial education. Such a type of research, even if it failed, would be a distinct contribution. It may be the answer. If it isn't the answer, the fact that it isn't is worth knowing.

It should be remembered that prefect prediction is probably not attainable and never will be. There is the boy who loses interest because he finds that he must leave school as soon as the law allows and has no further incentive to study; there is the girl who becomes ill and is absent too much to keep up with the class; there is the boy with capabilities who obtains afternoon and Saturday work after starting bookkeeping and fails for the same reason; there is the boy who cheats and is heavily penalized, etc. It seems that some of these variables will always be present. It is up to commercial educators to do the best that they can with them.

Briefly, it is recommended that every school that at present can correct mistakes made in the selection of vocational bookkeeping students adopt the principle of selection and that there is need for further research in bookkeeping prognosis following the procedure outlined above in these recommendations rather than on a trial and error basis that has been so prevalent in the past.

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Whitman (Massachusetts) High School Data from Office Records, Teachers' Grade Books and Prognostic Test Results.

APPENDIX A

APPENDIX A

a. Martin, Gladys V. "A Correlation of High School Student Marks in Commercial Mathematics and First- and Second-Year Bookkeeping". Unpublished Master's thesis, University of Pittsburgh, 1935.

b. Nelson, H. Chester. "A Study in Bookkeeping Prognosis in the High School". Unpublished Master's thesis, Columbia University, 1929.

c. Stedman , Melissa B. "Factors Influencing School Success in Bookkeeping". Journal of Applied Psychology, XIV (February, 1930), pp. 74-82.

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f. O'Brien, Raymond J. "Factors Contributing to Success in Learning Bookkeeping". Unpublished Master's thesis, University of Chicago, 1935.

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i. Fitzpatrick, Henry J. "Success in Elementary Bookkeeping as Related to Success in Certain Other High School Subjects and to Intelligence Ratings". Unpublished Master's thesis, New York State Teachers College, 1928.

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A a

SUMMARY OF RESEARCH IN BOOKKEEPING PROGNOSIS

Martin, Gladys V. "A Correlation of High School Student Marks in Commercial Mathematics and First- and Second-Year Bookkeeping". Unpublished Master's thesis, University of Pittsburgh, 1935.

The purpose of the above thesis is similar to that of this one. The first semester failures of the 1934-1935 school year in two Pittsburgh high schools were as follows: Bookkeeping I 16.8%, Bookkeeping II 14.8%, Bookkeeping III 6.8%, Bookkeeping IV 9.7% and Bookkeeping V 0.0%. In search of some method of predicting pupil success in bookkeeping, the author concluded that "the conflicting findings of the studies (concerning prediction) reported indicate the need for a further study of possible measures by which to predict possible success in bookkeeping".

The author states that "this study has been made to find the correlation between commercial mathematics and bookkeeping to determine whether or not school marks in commercial mathematics can be used to predict success or failure in bookkeeping". Both final grades and individual test scores in these two subjects are correlated.

The final grades in this study are those recorded for all commercial students who, at some period, studied commercial arithmetic and bookkeeping in Dormont High School, September,

1927 to January, 1934 and in South Hills High School, September, 1929 to January, 1934. The test grades used in this study are the results of two tests given to the second-year bookkeeping classes in the Dormont High School. The arithmetic test is Gregg's "National Objective Tests in Applied Business Calculation" which contain the fundamental processes thought to be needed for second-year bookkeeping, addition, subtraction, multiplication, division, percentage and fractions. The bookkeeping test is Carlson's test, Number 9, Series A, containing questions on adjusting entries, classification of accounts, working sheet, closing and post-closing entries.

Holzinger's formulae were used to find the coefficients of correlation and the probable error for each coefficient.

The summary of the correlations of final marks in commercial mathematics and bookkeeping for students in the Dormont High School and the South Hills High School is presented on the following page.

TABLE A. SUMMARY OF CORRELATIONS FOUND AT DORMONT AND SOUTH HILLS HIGH SCHOOLS

Subjects	Number of Cases	Coefficient Correlation	Probable Error
Commercial Mathematics I - Bookkeeping I	803	.459	.018
Commercial Mathematics I - Bookkeeping II	564	.428	.023
Commercial Mathematics I - Bookkeeping III	308	.387	.032
Commercial Mathematics I - Bookkeeping IV	260	.313	.037
Commercial Mathematics II - Bookkeeping I	892	.568	.015
Commercial Mathematics II - Bookkeeping II	642	.521	.019
Commercial Mathematics II - Bookkeeping III	328	.400	.031
Commercial Mathematics II - Bookkeeping IV	268	.402	.034

The summary of the correlations of test grades in commercial mathematics and bookkeeping for second-year bookkeeping students in Dormont High School is presented next.

TABLE B. SUMMARY OF TEST GRADE CORRELATIONS IN DORMONT HIGH SCHOOL

	Number of Cases	Coefficient Correlation	Probable Error
Results of the correlation of the raw scores	37	.451	.088
Results of the correlation of the letter grades	37	.355	.096

The findings and implications of this study are as follows:

1. There is no significant correlation between marks earned in commercial mathematics and marks earned in first- and second-year bookkeeping.
2. The test grades do not show any different correlation than do the letter grades in the same subjects.
3. The raw scores on the same tests show no different correlation than do the letter grades.

"If, in this study, bookkeeping had been correlated with other high school subjects, some other subject might have been found that would give a higher coefficient of correlation than did commercial mathematics".

Nelson, H. Chester. "A Study in Bookkeeping Prognosis in the High School". Unpublished Master's thesis, Columbia University, 1929.

The purpose of this research was "to see whether or not the guiding advice of the principal can be made more reliable in one particular case - bookkeeping ..... In the school with which the writer is connected, there has been 43.7% unsatisfactory work in beginning bookkeeping during the past four years."

"There is no single standardized prognosis test available at the present time by use of which a principal would feel justified in telling one pupil that he should take a commercial course and another pupil that he should not".

The author stated again "the main purpose of this work - to help the principal to do better what he is going to do anyway; namely, predict from the individual record card".

The data were gathered from the school records of Windham High School of Willimantic, Connecticut. Willimantic had a population of 15,000; the school a population of 650, one half of whom came from surrounding country and villages.

The records of 243 tenth-grade commercial pupils were used. These pupils appeared typical, perhaps slightly above the average for the country as a whole. The median mental age for all tenth-grade pupils was 15.9 years or about one year higher than that of the country as a whole. The average intelligence quo-

tient of the tenth-grade commercial pupils was 102.4, as compared with 103.5 for all tenth-grade pupils at Windham High School.

Passing grade was 70. Bookkeeping and commercial arithmetic were tenth-grade subjects and freshman English and algebra were ninth-grade subjects.

The following quotations were significant for a complete understanding of the findings:

> Freshman average is really the median of the four subjects of the freshman year, selected, for the most part, from these - English, algebra, ancient history, Latin, civics and general science.
>
> The intelligence quotient was taken from the Terman Group Test of Mental Ability which was given at the beginning of the freshman year.
>
> Age at starting bookkeeping was figured to the nearest month. Mental age at starting bookkeeping was figured from intelligence quotient and age with the assumption that the intelligence quotient had been constant for one year.
>
> Correlations were calculated by the Pearson product-moment formula.

Correlations thus found are presented in summary table form on the following page.

TABLE C. NELSON'S BOOKKEEPING PROGNOSIS CORRELATIONS.

	Correlation Coefficients	Probable Error
Freshman Average - Intelligence Quotient	.44	.03
Bookkeeping - Intelligence Quotient	.41	.03
Bookkeeping - Freshman Average	.63	.025
Bookkeeping - Freshman English	.48	.03
Bookkeeping - Commercial Arithmetic	.54	.03
Bookkeeping - Mental Age	.30	.04
Bookkeeping - Freshman Algebra	.59	.03
Bookkeeping - Chronological Age	-.19	.04

The author concluded that, "insofar as this work is an indication of general facts, these items seem outstanding.

1. The general average of freshman subjects is the best predicting factor of bookkeeping success available at the close of the freshman year. The correlations of bookkeeping with freshman average is .63.

2. Subjects that have something common with bookkeeping, such as algebra or commercial arithmetic, correlate more highly with bookkeeping than do subjects like English.

3. The grade of any single subject of the freshman year is a better measure of bookkeeping ability than an intelligence test.

4. Intelligence quotient is a better measure of bookkeeping ability than is mental age.

5. Chronological age, for high school ranges, has almost no re-

lationship to bookkeeping ability.

6. Freshman algebra, which correlates .59, is the best single subject from which to predict bookkeeping success the following year.

7. To predict success in bookkeeping, freshman average alone serves practically as well as freshman average and mental age combined.

8. On the basis of intelligence alone, one cannot advise a pupil not to take bookkeeping.

9. By using freshman average alone, the guiding advice of the principal can be improved.

10. There is need for research work that will show the value, for predicting bookkeeping success, of such subjective factors as energy, industry, accuracy, orderliness, initiative.

Stedman, Melissa B. "Factors Influencing School Success in Bookkeeping". Journal of Applied Psychology, XIV (February, 1930), pp. 74-82.

In order to determine factors that influence success in bookkeeping, the author correlated many factors with both Carlson's bookkeeping tests and bookkeeping teacher grades. She tested seventy-five children in the Bell High School in Los Angeles in September and checked them one year later. The intelligence quotient range was from 73 to 123 with an average of 95.

Spelling, arithmetic, typing strokes per minute, the MacQuarrie Test of Mechanical Aptitude, the Thurstone Employment Test, the Terman Group Test of Mental Ability and combinations and parts of these were correlated with Carlson's test and bookkeeping teacher grades. A summary of these correlations is presented on the following page.

The correlation between the Terman total score and Carlson bookkeeping score of .648±.057 "indicates that the intelligence test discovers only the ability to understand the theory but does not discover to the same extent the aptitude or willingness to do the routine work necessary for actual bookkeeping".

> The group studied included fourteen children with intelligence quotient below 90, and of this group below 90 intelligence quotient not one secured a grade above average and only five of the fourteen managed to secure an average or satisfactory grade, and this was by students who were carrying a light

TABLE D. STEDMAN'S BOOKKEEPING PROGNOSIS CORRELATIONS

Factors Correlated with Carlson Score and Bookkeeping Grade	Carlson Score	Bookkeeping Grade
Thurstone combined score minus test 5	.730±.047	.742±.045
Thurstone combined score		.568±.06
Thurstone tests 1 (checking), 4 (arithmetic) and 8 (code and proverbs)	.560±.07	.492±.077
#Arithmetic fundamentals (four-minute test of the writer)		.628±.06
Thurstone combined score, minus test 5, (alphabetizing) combined with arithmetic fundamentals		.710±.049
Terman total score	.648±.057	.557±.070
*MacQuarrie Test of Mechanical Ability	.176±.100	
Typing strokes per minute		.398±.106
*Spelling	.325±.081	.295±.084

* Too low to be significant # Worthy of further development

TABLE E. STEDMAN'S BOOKKEEPING PROGNOSIS CORRELATIONS OF PHYSICALLY FIT AND HANDICAPPED STUDENTS

	Correlation with Bookkeeping Grade		
	All Students	Physically Fit Students	Physically Handicapped
Thurstone score minus test 5	.587±.08	.742±.045	-.31±.215
Terman score	.438±.075	.557±.07	-.70±.121

program and spending many hours each day in home study. No child with intelligence quotient below 78 secured a satisfactory or average grade, while nine of the fourteen secured an unsatisfactory or failing grade. There were fourteen children with intelligence quotient between 90 and 99, and of this group seven were below average or failing and seven were average or above average. Of the nineteen other children with intelligence quotient above 100, sixteen secured an average or above average grade and three received below average but there were no failures.

Conclusions

1. The findings of this study would indicate that a child with intelligence quotient below 80 should, under no consideration, be allowed to take up the study of bookkeeping, while the child of intelligence quotient between 80 and 90 should be allowed to take bookkeeping only if he has a capacity for hard work, is industrious, healthy and if his position in life is such that he is to have definite need of it.

For the child with intelligence quotient above 90, who is willing to work, has physical health, an aptitude for the work and likes the subject there is no positive assurance that he will succeed, but it is safe to allow him to try.

2. By the use of the modified form of the Thurstone Clerical Test and tests in the fundamentals of arithmetic it is possible to predict with almost absolute accuracy the maximum possibilities of any student entering a class of bookkeeping. ,....only one student who scored below the mean on the Thurstone Test received a bookkeeping score above the mean, and in that one case the student was placed in the first interval below the mean. The child may not come up to expectations, illness, idleness, home conditions, clashing of personality with the teacher, and many other things may enter into the matter to prevent the full success to be expected, but it is possible at least to know that for certain individuals success is not possible.

3. The study revealed the fact that so long as impaired health was a factor it was not possible to predict with any degree of accuracy the work to be

accomplished in bookkeeping.

The outstanding thing indicated by this study is the absolute necessity of health on the part of the bookkeeper. Heart and lungs must be healthy and keep the body supplied with a reserve of energy if the individual is to stand the constant strain of close painstaking work at a desk. Even children with superior ability and aptitude cannot succeed in bookkeeping if the health is impaired.

4. Vocational and educational guidance of the child must start with health guidance and constructive follow-up work in the form of medical attention necessary to a healthy body.

Medical and dental care must be accessible and as easily obtained by the child as is education if education is to be effective and the child is to become a useful citizen.

Quay, Mark H. "A Prognostic Test for Elementary Bookkeeping". Unpublished Master's thesis, Temple University, 1934.

> The exact nature of the problem at hand is the preparation of a short, easily administered and scored, strictly objective prognostic test, to be given to beginners in bookkeeping on the first day the new class meets. This test should forecast for the teacher the degree of achievement to be expected from each pupil as a result of instruction during the coming term--other things being equal--and aid him in organizing instruction groups and material which will more satisfactorily meet the needs and abilities of each child under his care.
>
> To measure the efficiency of the above-mentioned prognostic test a strictly objective achievement test must also be prepared and given to the same pupils at the close of the first term of bookkeeping instruction. This latter test should be based on the minimum essentials required for the course by those directing the Commercial Curricula in the schools involved.
>
> The MAIN PURPOSE of the thesis is to determine whether the author's prognostic test, based on the pupils' ability to analyze and then express the effect of business transactions of a strictly cash nature, has a satisfactory degree of reliability.

The prognostic test given was very short, having only ten questions and based on a brief teacher explanation.

On the following page are examples of questions found on this test.

TABLE F. SAMPLE QUESTIONS FROM QUAY'S PROGNOSTIC TEST.

	You Own		You Are Worth	
	More of	Less of	more	less
You receive $10 cash from your father as your weekly allowance.	cash $10.-		cash $10.-	
You pay $7 for candy which you will sell to your classmates.	candy $7.-	cash $7.-		no change

This test was administered to sixteen different classes of a total of 505 pupils. The results were as follows:

Number Right	Per cent	Number
10	6.5	32
9	7.1	36
8	8.7	44
7	9.5	51
6	12.1	61
5	14.7	74
4	13.5	68
3	10.5	51
2	5.0	25
1	7.5	38
0	5.9	25
	100.0	505

The achievement test contained sections of questions on journalizing, posting, trial balance, classification of accounts, general knowledge, information on such questions as gross sales, net purchases, gross expenses, total assets, etc.

Between the prognostic test and the achievement test the coefficient of correlation was .216, "too low to be of any real value".

The writer found certain weaknesses with the prognostic test, such as, too many similar items, the test wasn't understood, there were too many low scores, teachers failed to give instructions, there probably should have been more arithmetic, penmanship, etc.

Conclusions

The .216 correlation established between the prognostic test and the achievement test previously presented, is not reliable and cannot be used to:

a. group pupils homogeneously,
b. predict probable achievement,
c. guide pupils in their study of bookkeeping,
d. determine whether pupils are doing their best work.

The prognostic test did prove effective in:

a. serving as a foundation lesson for the course,
b. acquainting pupils with the value of bookkeeping work,
c. getting pupils promptly to work,
d. showing that the teacher meant business,
e. awakening pupil interest in the course,
f. acquainting teachers promptly with many of the most able pupils.

The achievement test did show that:

a. in most cases, instructions were effective,
b. pupils were securing a thorough understanding of fundamental bookkeeping principles and methods,
c. the weak points in bookkeeping are in preparing the business statements and analyzing account information. However, business houses would not allow juniors to perform this type of work anyway. Trained accountants are more and more being called for these items since a specialized training and experience are required.

Strauss, Harold W. "The Effect of General Intelligence and Achievement in Arithmetic on Success in Bookkeeping". Unpublished Master's thesis, Rutgers University, 1930.

The main object of this paper is to report an investigation of the facts of correlations among (1) students' achievements in bookkeeping, (2) their achievements in eight years of arithmetic and (3) their general intelligence (I. Q.) with a view of establishing the following:

1. How well we are able to predict a student's success in bookkeeping by considering his State Examination in arithmetic and his intelligence quotient.

2. How important each factor (intelligence quotient and State Examination mark) is in determining that success.

3. A minimum contribution of intelligence quotient and State Examination mark to be achieved by the student in order to be reasonably sure of his success in bookkeeping.

The data were taken from the records of 134 students in the ninth grade of the Roosevelt Junior High School, New Brunswick, New Jersey. The Otis Test to determine the intelligence quotient and the State Examination in arithmetic were administered at the conclusion of the eighth year. Bookkeeping tests given at the conclusion of chapters 4, 15, 26 and 33 of Bowman and Percy's "Principles of Bookkeeping" were used to determine the students' achievement in bookkeeping. The test scores were added together to obtain a total score.

TABLE G. COEFFICIENTS OF CORRELATION AS DETERMINED BY STRAUSS

Correlated With	Bookkeeping Score
Intelligence Quotient	.77 ± .024
State Arithmetic Examination	.51 ± .043
Intelligence Quotient and State Arithmetic Examination combined	.82

Conclusions (only significant ones are quoted)

The intelligence quotient is more reliable than the State Examination as a base upon which to predict a student's success in bookkeeping.

We could make almost as accurate a prediction of the student's success in bookkeeping if we based that prediction on the intelligence quotient alone as we could if we also considered his mark in the State Examination in arithmetic. However, our accuracy would be increased slightly by considering the latter mark in our prediction.

The multiple coefficient of correlation between the bookkeeping score on the one hand and the intelligence quotient and State Examination marks taken as a team on the other (...82) is very high.

....so far as the two factors intelligence quotient and State Examination mark "enter into" the determination of the bookkeeping mark they contribute with the relative weight of about 2.6 to 1.

Stated negatively, if the student's intelligence quotient multiplied by $1\frac{1}{4}$ when added to his State Examination mark multiplied by $1\frac{3}{4}$ does not produce a sum of at least 159, then the chances are 2.15 to 1 that he will not succeed in bookkeeping.

In the application of statistical results it would be remembered that the student often loses his individuality and very few of his qualities can be measured statistically. Therefore, common sense should guide the user of any statistical results obtained in this report. Statistics, as such,

are excellent guides and indicators, but a too vigorous adherance to them will defeat their own purpose. They should serve as means to a desired end and never as an end in itself.

O'Brien, Raymond J. "Factors Contributing to Success in Learning Bookkeeping". Unpublished Master's thesis, University of Chicago, 1935.

One concomitant of the increased enrollment in commercial courses is to be seen in the low percentage of students who make creditable achievement in bookkeeping.

The condition in Bookkeeping I in the school chosen for investigation was as follows:

S (95-100)	18	9.42%
E (86-94)	27	14.14%
G (81-85)	56	29.32%
F (75-80)	72	37.70%
D (below 75)	18	9.42%

Although the percentage of failures (D) is within reason, a percentage of 37.70 for the lowest passing mark (F) is disproportionately high. The combined total of those who received "D" or "F" is 47.12% of the entire number of pupils embraced by the study. This means that almost half of the pupils either failed or received the lowest passing mark possible.

Consultation with the teachers revealed the fact that many pupils who normally should have failed were given passing marks either as a reward for unusual effort made or merely to prevent the final percentage of failures from exceeding a traditional minimum.

The ultimate problem of determining procedures that will significantly decrease this percentage of low achievement has not yet been met by an accepted solution. As a preliminary to such a solution, it is necessary to investigate thesolution and to attempt to discover the factors that contribute to success in commercial subjects. The purpose of this study is to make such a preliminary investigation. The field selected is that of bookkeeping.

.....certain traits have been selected; and an attempt will be made to discover the extent to which they operate as factors in determining success

in the study of bookkeeping.

These specific factors and traits are:

1. Reading ability
2. Arithmetic ability
3. Mental ability
4. Perseverance
5. Accuracy
6. Initiative
7. Neatness
8. Industry

The main part of this study will be devoted to the establishing of statistical relationship between the eight factors named above and the achievement of general success in learning bookkeeping.

The study was conducted in a large senior high school with 191 pupils composed of sophomores, juniors and seniors from 15 years, 5 months to 19 years, 7 months, with an average age of 17 years, 2 months.

Criterion of success in bookkeeping used in this study was achievement at the end of the first semester of bookkeeping as tested by Elwell-Fowlkes Bookkeeping Test, Form 1A. Reading ability was tested by the Iowa Silent Reading Test Form 1A. Diagnostic Tests in the Fundamental Operations of Arithmetic and in Problem Solving by Reavis and Breslich were used to test arithmetic ability. Otis Self-Administering Test of Mental-Ability - Higher Examination - Form B was the test of mental ability. Evaluation of personality traits was made by the Bookkeeping II teachers, as follows:

Accuracy - 5 Extremely accurate
4 High degree of accuracy
3 Moderate degree of accuracy
2 Inexact - somewhat careless
1 Slovenly

Industry - 5 Exceptionally industrious
4 Steady hard worker
3 Fairly industrious
2 Takes things easy
1 Lazy

Perseverance - 5 Makes a tremendous effort
4 Makes a good effort to complete task
3 Makes a fair trial
2 Gets discouraged at times
1 Easily discouraged

Initiative - 5 Creative - aggressive - original
4 Energetic - some originality
3 Moderately independent
2 Lacks originality and aggressiveness
1 Routine - passive

Neatness - 5 Work always neatly done - definitely arranged
4 Appearance of good work
3 Fairly neat - room for improvement
2 Not very neat - careless
1 Blots - cancellations - erasures

Paragraph meaning (.341±.043), word meaning (.404±.041), sentence meaning (.293±.045) and location of information (.311±.044) are the specific reading abilities which were found to be direct and positive factors entering into success in learning bookkeeping as measured by a standardized objective bookkeeping test.

TABLE H. O'BRIEN'S CORRELATIONS OF ARITHMETIC ABILITIES WITH BOOKKEEPING TEST SCORES AND BOOKKEEPING GRADES

	Bookkeeping Test Scores	Bookkeeping Grades
Total Calculations	.280±.045	.240±.046
Problem Solving	.394±.041	.170±.047
Total Arithmetic Ability	.404±.041	.219±.047

Total arithmetic ability is a major factor of success in learning bookkeeping as measured by a standardized test.

TABLE I. O'BRIEN'S CORRELATIONS OF MENTAL ABILITY WITH BOOKKEEPING TEST SCORES AND BOOKKEEPING GRADES

	Bookkeeping Test Scores	Bookkeeping Grades
Intelligence Quotients	.472±.038	.109±.048
Raw Scores (equivalent of mental age)	.606±.031	.082±.049

The intelligence quotient is a strong factor in learning bookkeeping as measured by a standardized test. The degree of mental development as measured by the Otis raw scores is a very strong factor in learning bookkeeping as measured by a standardized test. Neither has significant correlation with teacher grades.

TABLE J. O'BRIEN'S CORRELATIONS OF PERSONAL TRAITS WITH BOOKKEEPING TEST SCORES AND BOOKKEEPING GRADES

Teacher Estimates of Some Personal Traits	Bookkeeping Test Scores	Bookkeeping Grades
Accuracy	.560±.034	.557±.034
Industry	.440±.040	.586±.032
Perseverance	.442±.039	.492±.037
Initiative	.563±.033	.505±.037
Neatness	.436±.040	.505±.037
Total Estimate	.550±.034	.502±.037

O'Brien considers those factors having correlations of over .450 with bookkeeping as strong factors.

Conclusions

1. Arithmetic, reading, mental ability and some of the personal traits correlate positively with bookkeeping ability as measured by a standardized bookkeeping test.
2. Teachers' grades in bookkeeping don't correlate as closely with arithmetic, reading and mental ability as do bookkeeping test scores.
3. Teachers' grades are not as good measures of bookkeeping ability as are scores derived from a standardized test.

Forsgard, Fred G. "Indices to Mastery in Business Courses". Journal of Business Education, XVI, (February, 1941) pp. 17-18, (March, 1941) pp. 13-14.

In an attempt to discover what indices could be used to predict success in business subjects with some degree of accuracy I have administered a series of tests in the Upper Darby Senior High School and correlated them with various commercial subjects. In this project a total of approximately three hundred twenty-five students was involved.

The first standardized test I used was the Minnesota Vocational Test for Clerical Workers by Dorothy M. Andrews and Donald G. Paterson. This test was developed for the specific purpose of predicting success in clerical work of all kinds and many studies have shown, according to the authors, that it is useful as an instrument in the prognosis of achievement in shorthand, typewriting and bookkeeping.

The test is made up in two parts, the first part a number checking test and the second a name checking test. The number checking portion of the test consists of two hundred items, each of which is made up of a pair of numbers ranged side by side with an underlined space between them. If the two numbers are exactly the same the student is instructed to write a check mark on the line; if they are different he is instructed to make no mark on that line. The name checking portion of the test consists of two hundred items made up of pairs of names written side by side in the same manner as the numbers. The student, as in the numbers test, checks the items in which the two names in the pair are exactly alike.

To secure a measure of English ability I used the Minneapolis English Classification Test, Form A, by R. B. and R. C. Hackman. This test was first devised for use in the adult education classes in the Minneapolis Public Schools and represents an attempt to find out how well the student knows English grammar and usage. It consists of forty-four English sentences on front of each of which is a square. The student is instructed to read each sentence carefully and decide whether it is correct as it stands. If it is correct he is to put a

plus sign in the square in front of the sentence, a nd if it is incorrect he is to write a zero in the square. Then he is to cross out the incorrect word or words and write the correct word or words on a line just below the sentence, being careful not to change the meaning of the sentence.

The intelligence quotients of the students were secured from the records of the school psychologist of the Upper Darby High School. The Otis tests were used in all cases, but different tests were used for different classes.

The tenth grade students, measured in this study for ability in bookkeeping, were given the Otis Quick-Scoring Mental Ability Tests, Beta Test, Form B. This test is devised for grades four to nine and was given to these students when they were in the ninth grade.

A bookkeeping test of the objective type was administered to the tenth grade students taking first year bookkeeping at the end of the first semester. The test consisted of six parts. Part I consisted of true-false questions, Part II of completion questions, Parts III and IV of multiple-choice questions, Part V of matching items, and Part VI required the preparation of a work sheet, a profit and loss statement, adjusting and closing entries and the posting of them, all from a trial balance. The problem in Part VI had a maximum score of one hundred points. Part I - twenty points, Part II - fifteen points, Part III - eight points, Part IV - ten points and Part V - twenty points. The total possible score for the entire test was one hundred seventy-three points.

Table V (K) indicates the relation between the prognostic scores and the bookkeeping scores. From this table the relation of the Minnesota tests to the bookkeeping scores is seen to be insignificant. The relation of the Otis I. Q. to bookkeeping is quite marked, being somewhat above the coefficient usually accepted as existing between intelligence and school success. The English recognition score shows a relationship slight but present and the usage score shows a negligible relationship.

TABLE K. FORSGARD'S RELATIONS OF PROGNOSTIC TEST SCORES TO BOOKKEEPING TEST SCORES

	No. Cases	Prognostic Test Average	Bookkeeping Test Average	Correlation
Minnesota No. 1	49	107	148	.0145±.0963
Minnesota No. 2	49	103	149	.1919±.0928
Otis I. Q.	40	106	146	.5486±.0746
English - Recognition	47	15	148	.2159±.0947
English - Usage	47	23	148	.1641±.0960

The Otis intelligence tests show a significant relationship with .... bookkeeping..... .

The Minneapolis English Classification Test in its recognition score .... is .... only slight with .... bookkeeping.

An English test showing ability to recognize errors in grammar and an ability to use the language would, according to this study, have a moderate degree of prognostic value in predicting success in .... bookkeeping.

Sukovaty, Arnost. "A Study of Elementary Business Training As an Indication of Probable Success In the Major Commercial Subjects, Bookkeeping and Shorthand". Unpublished Master's thesis, New York State Teachers College, 1928.

This investigation is a study of Elementary Business Training as an indication of probable success in the major commercial subjects, bookkeeping and shorthand.

In their applications to the practical aspects of educational guidance, the problems of the investigation are stated by the writer in the form of questions, as follows:

(1) Should there be any prerequisite before actual special commercial work is undertaken?

(2) Should such prerequisites be required for both courses?

(3) Do such prerequisites contain any elements for predicting success in either of the courses offered?

(4) Will a knowledge of what a student is able to do in the prerequisite enable us to advise more intelligently the students in the choice of program before they become sophomores, juniors and seniors?

(5) Could the general average of the freshman year be used more profitably than the results of Elementary Business Training?

(6) May either, or both, of these freshman items be used as a means of prognosis?

The data were obtained from the records of 633 high school students at Albany, New York. The data included:

(1) Regents Marks in Elementary Business Training.

(2) Regents Marks in Elementary Bookkeeping.

(3) Regents Marks in Advanced Bookkeeping.

(4) Regents Marks in Elementary Shorthand.

(5) Regents Marks in Advanced Shorthand.

(6) General Average of the Freshman Year, computed by myself, from Regents Marks in
  (a) English I (school examination)
  (b) Biology
  (c) Commercial Arithmetic
  (d) Elementary Business Training

(7) Teachers' Class Marks, average of the first term (three report periods) in Advanced Bookkeeping.

(8) Teachers' Class Marks, average of the first term (three report periods) in Advanced Shorthand.

The correlations found in this study that apply to the problem of this thesis are as follows:

TABLE L. SUKOVATY'S CORRELATIONS BETWEEN ELEMENTARY BUSINESS TRAINING AND FRESHMAN AVERAGE AND ELEMENTARY BOOKKEEPING

	Elementary Bookkeeping All	Elementary Bookkeeping Business	Elementary Bookkeeping Secretarial
Elementary Business Training	.147±.040	.349±.059	.205±.048
Elementary Business Training (passing)	.195±.042		
General Average - Freshman Year	.409±.035	.310±.062	.395±.042

Conclusions and Recommendations

Only the conclusions and recommendations that are relevant to this study are quoted.

(1) Correlation does exist between Elementary Business

Training and ultimate success in Bookkeeping when measured by the completion of Advanced Bookkeeping. This is especially true of the Business group of students.

(3) The general average of the marks obtained in the Regents examinations of the subjects of the freshman year are a better indication of what a student will do in Elementary Bookkeeping than the mark obtained in Elementary Business Training.

(4) Undoubtedly the marks obtained by students in Elementary Bookkeeping .... are a good indication of the quality of work such students will do in Advanced Bookkeeping .... .

(5) I have shown that the coefficients of correlation are too low to have any great amount of prognostic value. A few may be used to foretell, within limits depending on the correlation, what a student might be expected to make as his mark in his Sophomore, Junior and Senior subjects, expecially in the major commercial subjects, Bookkeeping .. .

(6) I would recommend that a passing grade in Elementary Business Training be kept as a requirement to the study of .... Bookkeeping, ...

(8) There is need for prognostic measures in the commercial course that are more accurate than the subjects themselves can be.

(9) The General Average of the Freshman Year, Grades in Elementary Business Training, Grades in Elementary Bookkeeping .... may be used by advisers in outlining the program for the more advanced years, taking into consideration the inclinations and ambitions of the student at the time of his choosing of the major subject in the commercial course.

Fitzpatrick, Henry J. "Success in Elementary Bookkeeping as Related to Success in Certain Other High School Subjects and To Intelligence Ratings". Unpublished Master's thesis, New York State Teachers College, 1928.

> This study is an attempt to determine, if possible, some factors in first-year high school work which will indicate probable success in Elementary Bookkeeping, a subject which has its place in the second year of high school. The investigation is confined to regularly enrolled students of the Commercial Department of the high school at Albany, New York.
>
> The conclusions are based on the following data:
>
> (1) Official Regents marks in Elementary Business Training, Commercial Arithmetic and Biology; and school marks in first year English (June, 1927).
>
> (2) Official school ratings in intelligence tests given in the Fall of 1926.
>
> (3) General averages and averages in Commercial subjects alone, computed by myself.
>
> (4) Teachers' grades in Elementary Bookkeeping for the first report period (1927-28).
>
> (5) Teachers' averages for the first term in Elementary Bookkeeping (1927-28).
>
> (6) Ratings in Carlson Bookkeeping Test given at the close of the first term (1927-28).
>
> (7) Teachers' marks in subjects mentioned above in (1) (June, 1927).

A table showing the coefficients of correlation that are relevant to the problem under discussion in this thesis is presented on the following page, followed by conclusions quoted from Fitzpatrick's thesis.

TABLE M. TABLE OF COEFFICIENTS OF CORRELATION FROM FITZPATRICK'S STUDY.

	Elementary Bookkeeping First Period	Elementary Bookkeeping First Term	Elementary Bookkeeping Carlson #3
Elementary Business Training (Regents)	.171±.056	.246±.054	.267±.056
Commercial Arithmetic (Regents)	.145±.056	.198±.056	.389±.052
Averages of Elementary Business Training and Arithmetic	.171±.056	.236±.054	.399±.051
*General Averages	.160±.056	.229±.055	.407±.051
Intelligence Ratings (Raw Scores)	.017±.059	-.031±.059	.227±.059

The first period refers to the first report-card period of six weeks. The first term refers to the first three six-week report periods.

*General averages were the averages of Regents grades in Elementary Business Training, Commercial Arithmetic and Biology and grades in the school examination in English I.

Conclusions

Part I

(1) There is a vital need for real, organized educational and vocational guidance in the Albany school system as shown by the number of failures and drop-outs in the commercial course during Freshman year and between Freshman and Sophomore years.

(2) There is apparently no great relationship between success in Elementary Business Training and success in Elementary Bookkeeping and therefore no

pupil should be required to obtain a passing grade in the Regents examination in that subject before being allowed to enter upon his work in Elementary Bookkeeping.

(3) The same holds true concerning success in Commercial Arithmetic and success in Elementary Bookkeeping and the arguments against any special requirements in Commercial Arithmetic are sustained.

(4) There has been no basis for forecasting success in Elementary Bookkeeping discovered by the study made in this thesis which is due, perhaps, to the highly specialized nature of bookkeeping.

Part II

(1) Intelligence ratings are an excellent indication of a pupil's general ability.

(2) However, intelligence ratings are of no prognostic value in determining the probeble success of a pupil in any one particular subject.

(3) In order to get the greatest advantage out of ability grouping, there is need for specialized tests in each subject to classify a pupil properly in that subject.

Rosenblum, Irving. "Criteria For the Selection of Pupils For the Junior High School Bookkeeping Course". Unpublished Master's Thesis, College of the City of New York, 1929.

The problem of success in bookkeeping presented itself when it was found that some pupils each term seemed doomed to mediocrity or failure. If it be true that there must be some failures every term, should not some attempt be made to reduce the educational waste, to discover and eliminate the potentially poor bookkeeper?

The main problem then became a search for criteria for selecting pupils for the junior high school bookkeeping course. In attempting to gain that end, smaller problems presented themselves. What would be the intelligence level necessary in order to succeed in bookkeeping? Would the reasoning subjects in the seventh and eighth years of the junior high school have any predictive value for achievement in bookkeeping? What academic subjects, if any, might act as keys to bookkeeping ability? Would a Carlson test of the South-Western Publishing Company afford a satisfactory means of achievement in bookkeeping?

In an attempt to answer these questions, a study was made of all three commercial classes in the ninth year at the East New York Junior High School (June, 1926). Of the three classes, one was a rapid progress group, while the other two were slower classes. The pupils ranged in age from twelve years eleven months to sixteen years eight months. The group originally comprised 104 students but this number was reduced because of incomplete information to 70, 56 girls and 14 boys.

For each pupil a record was made of class marks throughout the junior high school, intelligence raw score (Terman Group Test of Mental Ability - Form A), chronological age, mental age, intelligence quotient, and bookkeeping ability according to class grade and an achievement test (Carlson Bookkeeping Test #3, Series A).

In using the bookkeeping class marks, there appeared a strong point - though incidental - in that the marks represented the opinions of

two teachers. The former bookkeeping teacher had been transferred to high school, and his 9A mark was averaged with the 9B mark of his successor ... This change removed the disadvantage of a bookkeeping mark representing the opinion of but one individual.

Before attempting the correlation of work in bookkeeping with work in the other subjects, some of the latter were dropped. The school subjects omitted were shop, cooking, sewing, music, oral expression, physical training, stenography, French and spelling. It was necessary to drop French and stenography because those subjects were not taken by all three commercial classes.

Two measures of bookkeeping achievement were used, the teachers' marks and the marks on the South-Western achievement test.

TABLE N. ROSENBLUM'S CORRELATIONS BETWEEN ACADEMIC SUBJECTS, AGE, INTELLIGENCE AND BOOKKEEPING ABILITY

Item	Bookkeeping Achievement	
	Class Grade	Carlson Test
Arithmetic	.493±.060	.493±.039
Grammar	.371±.071	.527±.057
Reading - Literature	.407±.061	.474±.060
Composition	.368±.069	.427±.064
Penmanship	.328±.071	.317±.071
Geography	.378±.071	.540±.056
History	.399±.067	.492±.060
Typewriting	.504±.059	.282±.073
Intelligence (raw score)	.129±.078	.386±.067
Bookkeeping (class marks)		.724±.038
Chronological Age		-.468±.062

TABLE O. ROSENBLUM'S TABLE OF CORRELATION BETWEEN TERMAN SUB-TESTS AND (CARLSON) BOOKKEEPING ACHIEVEMENT

Terman Sub-Tests	r P.E.
1. Information	.137±.078
2. Best Answer	.271±.074
3. Word Meaning	.052±.079
4. Logical Selection	.491±.060
5. Arithmetic	.401±.067
6. Sentence Meaning	.169±.077
7. Analogies	.533±.056
8. Mixed Sentence	.200±.016
9. Classification	.138±.078
10. Number Series	.200±.076
Intelligence (raw score)	.386±.067

Table 6 (o) indicates that an I. Q. of 100-109 offered about a 2/3 chance of passing bookkeeping while an I.Q. of 90-99 offered but an even chance of passing.

The study thus concluded suggests the following answers to the questions raised at the outset:

1. The subjects that are of most value in estimating potential bookkeeping achievement are arithmetic, grammar, geography, history and literature.

2. Intelligence "which may most safely be defined as that which standard intelligence tests measure" is of little value in itself as a key to the ability to do bookkeeping.

3. Of greater value than the intelligence test itself are the sub-tests in analogies, logi-

cal selection and arithmetic.

4. The Carlson test is a reliable measure of bookkeeping ability. The correlation between the test scores and teachers' bookkeeping grades was .724±.038.

APPENDIX B

APPENDIX B

a. Program of Studies in the High School, Whitman, Massachusetts.

b. MacQuarrie Test for Mechanical Ability, by T. W. MacQuarrie. Published by California Test Service, Los Angeles, California.

c. Thurstone Employment Test in Clerical Work, by L. L. Thurstone. Published by World Book Company, Yonkers-on-Hudson, New York. (Key and Directions)

d. Minnesota Vocational Test for Clerical Workers, by D. M. Andrew. Published by The Psychological Corporation, New York City, New York. (Tests 1 and 2)

e. Cooperative English Test, Test C1: Reading Comprehension by Frederick B. Davis and others. Published by Cooperative Test Service, New York City, New York.

f. Whitman High School Bookkeeping Selection Arithmetic Test.

g. Elwell-Fowlkes Bookkeeping Test, by Fayette H. Elwell and John G. Fowlkes. Published by World Book Company, Yonkers-on-Hudson, New York.

h. Bookkeeping Test No. 1 - Series K, Journalizing and Posting, by Paul A. Carlson. Published by South-Western Publishing Company, New York City, New York.

i. Bookkeeping Test No. 2 - Series K, Interpreting Records, by Paul A. Carlson. Published by South-Western Publishing Company, New York City, New York.

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B a

PROGRAM OF STUDIES

In the High School

WHITMAN, MASSACHUSETTS

Adopted March 22, 1940

BY THE

SCHOOL COMMITTEE

WHITMAN HIGH SCHOOL PROGRAM OF STUDIES

CURRICULA	FRESHMAN	SOPHOMORE	JUNIOR	SENIOR
CLASSICAL	**Required** English I 1 Latin I 1 Algebra I 1 World History 1 Physical Education ¼	**Required** English II 1 Latin II 1 Algebra II 1 French I 1 Physical Education ¼	**Required** English III 1 Plane Geometry 1 French II 1 U. S. History & Civics 1 **Elective** Latin III 1	**Required** English IV 1 College Preparatory Chemistry or Physics 1 **Elective** French III 1 Problems of Democracy ½ Economics ½ Solid Geometry ½ Trigonometry ½ Latin IV 1
SCIENTIFIC	**Required** English I 1 Algebra I 1 General Science 1 Physical Education ¼ **Elective** World History 1 Mech. Drawing I ¼	**Required** English II 1 Algebra II 1 French I 1 Biology 1 Physical Education ¼	**Required** English III 1 Plane Geometry 1 French II 1 U. S. History & Civics 1 College Prep. Physics 1	**Required** English IV 1 College Preparatory Chemistry 1 **Elective** Solid Geometry ½ Trigonometry ½ French III 1 Problems of Democracy ½ Economics ½
COMMERCIAL	**Required** English I 1 Business Training 1 Physical Education ¼ **Elective** General Science 1 Ancient History 1 Cooking I 1 Citizenship 1	**Required** English II 1 Bookkeeping IA 1 Coml. Geography A 1 Physical Education ¼ **Elective** { Stenography I } ½ { Typewriting I } ½ Cooking II 1 Med. & Mod. History 1 French I 1 Algebra I 1	**Required** English III 1 U. S. History & Civics 1 Bookkeeping II 1 or { Stenography II } 1 { Typewriting II } ½ **Elective** Algebra II 1 French II 1 Sewing I 1 Consumer Economics 1	**Required** English IV 1 Commercial Law ½ Advanced Cml. Arith. ½ Bookkeeping III 1 or { Stenography III } 1 { Typewriting III } 1 **Elective** Business Management 1 Problems of Democracy ½ Economics ½ Homemaking 1 Sewing II 1
GENERAL	**Required** English I 1 Business Training 1 Citizenship 1 Physical Education ¼ **Elective** Latin I 1 General Science 1 Cooking I 1 Ancient History 1 Mech. Drawing I ½ Freehand Drawing I ½	**Required** English II 1 Physical Education ¼ **Elective** Latin II 1 French I 1 Cooking II 1 Algebra I 1 Bookkeeping IB 1 { Stenography I } ½ { Typewriting I } ½ Med. & Mod. History 1 Biology 1 Coml. Geography B 1 Mech. Drawing II ½ Freehand Drawing II ½ Bookkeeping IA 1	**Required** English III 1 U. S. History & Civics 1 **Elective** Latin III 1 French II 1 Sewing I 1 Algebra II 1 General Physics 1 Bookkeeping II 1 { Stenography II } 1 { Typewriting II } ½ Consumer Economics 1 Mech. Drawing III ½ Freehand Drawing III ½	**Required** English IV 1 **Elective** Latin IV 1 French III 1 General Chemistry 1 Plane Geometry 1 Bookkeeping III 1 { Stenography III } 1 { Typewriting III } 1 Business Management 1 Problems of Democracy ½ Economics ½ Homemaking 1 Sewing II 1

NOTES

Stenography and Typewriting must be taken together at all times. In the Sophomore year Stenography is given twice a week and Typewriting three times a week, the two constituting one subject given five periods and carrying one unit credit. In the Junior and Senior years, Stenography and Typewriting will each be given five periods a week, the two constituting two subjects, carrying one and one-half units credit in the Junior year and two units credit in the Senior year.

Commercial Law will be given for the first three marking periods and Advanced Commercial Arithmetic for the last two marking periods. They will be ranked separately, each receiving one-half unit credit.

Bookkeeping IA (Vocational) and Commercial Geography A must be taken by those electing the commercial course. A student cannot advance from Bookkeeping IB to Bookkeeping IA or to Bookkeeping II, but can transfer from Bookkeeping IB to Bookkeeping IA if, after eight weeks, he has shown that he can do work of a vocational nature.

Both the Bookkeeping III and the Stenography and Typewriting III courses contain about eighty class periods devoted to office practices, such as filing, calculating machines, ditto, mimeograph, business etiquette, etc. In the Stenography and Typewriting III course, at least ten class periods are devoted to dictating machine work.

Students not wishing to pursue a strictly commercial course specializing in either Bookkeeping or Stenography and Typewriting may gain a basic knowledge of business principles and practices by electing Junior Business Training in the Freshman year, Commercial Geography B and Bookkeeping IB in the Sophomore year, Consumer Economics in the Junior year and Business Management in the Senior year of the General Course.

To take Bookkeeping IA or Stenography and Typewriting I students are asked to meet certain standards in the work of the Freshman year. These subjects require special knowledge and abilities and it is in the interest of the student that these standards are set up.

In advancing from the first year to the second year and from the second year to the third year in Bookkeeping, Stenography and Typewriting, students are advised to do so only if they have received an A or B grade or have the approval of the subject teacher in the previous year's work.

The number following a subject indicates the number of units which that subject counts toward a diploma.

The number of recitation periods per week is five in each subject except physical education which is given two periods per week.

Every pupil in school is eligible to elect work in the Glee Clubs, Orchestra or Band. These elections will be made after school opens in September. One-quarter of a unit is allowed toward a diploma for each year of work in these organizations, but not more than a total of two units may be credited toward a diploma. PUPILS SELECTING WORK IN THESE ORGANIZATIONS WILL BE CONSIDERED TO HAVE A SIX PERIOD DAY ON THE DAY WHEN THESE ORGANIZATIONS MEET, AND THE SCHOOL SESSION WILL NOT BE OVER FOR THEM UNTIL THEY ARE DISMISSED BY THE SUPERVISOR.

CHOICE OF A COURSE. A pupil who intends to enter a college or university should take the Classical or Scientific course. If preparation for work leading to the Bachelor of Arts degree is desired the Classical course should be elected. If preparation for work leading to the Bachelor of Science degree, a course in engineering or admission to a scientific school is desired, the Scientific course should be elected. In all cases the pupil should consult the Principal within the first month of the Freshman year if preparation for admission to a particular school is desired.

A pupil who intends to enter a State Teachers College should take the classical course or select subjects from the General course only on the advice of the Principal. The General course has been planned for pupils who desire only a well rounded high school education. It is not designed to fit pupils for higher institutions. The Commercial course gives a training for business life. It is designed chiefly for the pupil who must go to work immediately after leaving high school. It will prepare for the business schools but not for the Colleges of Business Administration. A pupil who intends to enter a College of Business Adminstration should not take a commercial course.

A girl who wishes to prepare for a Hospital Training School should take a college preparatory course if she wishes to be sure of entrance to the better schools. If she takes a General course she must take academic subjects of college preparatory grade. It takes the same preparation and just as good a scholastic record to enter a training school today as to enter a college.

A pupil who must take mathematics in college is strongly advised to take four years of mathematics in high school.

THE ATTENTION OF PARENTS is especially called to the fact that High School pupils must do most of their studying at home.

PUPILS are expected to spend in home study a daily average of two hours.

MOST FAILURES IN THE HIGH SCHOOL ARE DUE TO LACK OF HOME STUDY. It is strongly advised that pupils get part of their lessons in the afternoon and the remainder in the evening. If possible the pupil should be provided with a quiet room, apart from the family, for evening study.

REGULATIONS

SELECTION OF SUBJECTS. All subjects appearing in the required list of any course must be taken and must be passed to obtain a diploma from that course. A sufficient number of subjects from the elective list must be selected to make a total of fifteen (15) units, which is the number required to obtain a diploma. The number of units of credit (exclusive of music) which may be offered toward a diploma cannot exceed 5 units from the Freshman list of subjects, 5 units from the Sophomore list of subjects or 6 units from the Junior list of subjects. In addition 3 units from the Senior list of subjects must be passed to secure a diploma. No pupil may take more than four (4) subjects in any one year except where five (5) are called for in the required list, without the permission of the principal.

PROMOTION BY CLASSES. The number of units necessary for promotion to the Sophomore class is 3; to the Junior class 7; to the Senior class 11. A pupil entering his fourth year with conditions, that is with less than 11 units, will not be considered a candidate for a diploma. If such a pupil is allowed to take extra work to qualify for a diploma at the end of the fourth year he will be considered on trial for a period of 24 weeks. If at the end of the trial period he is failing in any subject his program will be readjusted and a fifth year will be necessary to obtain a diploma.

No class will be formed in any subject, except those essential to college preparation, unless a sufficient number of pupils elect that subject.

Only one foreign language may be begun in the same year, and it should be continued for at least two years if the pupil is proficient.

ATTENDANCE

A personal or written excuse from the parent or guardian is required for every absence, tardiness or dismissal.

No pupil is allowed to leave the school during the session without permission from the Principal or a teacher. Unless the pupil brings with him a written request for dismissal from his parent or guardian, he is permitted to leave only in case of emergency.

Teachers may require pupils to return to school in the afternoon for discipline or to make up neglected work.

All work missed by reason of absence must be made up. If the pupil has a legitimate excuse for absence he receives full credit for work made up.

The selection of subjects for each year should be made with great care as no changes can be made after school opens in September unless the parent or guardian personally appears at the office with a request for change. These requests will be given the personal attention of the Principal and if he deems it wise such requests will be granted.

MACQUARRIE TEST for MECHANICAL ABILITY

A Simple Group Performance Test for the Use
of School Counselors and Personnel Managers

By T. W. MacQuarrie, Ph. D.

FILL IN THE BLANKS BELOW, BUT DO NOT OPEN THE BOOKLET

City..... Date.....

School.....Grade.....

....., ...
(Print your last name) (Print first name and initial)

Age, last birthday.....Date of birthday .....

Copyright 1925 by T. W. MacQuarrie
All rights reserved

Published by
California Test Bureau
3636 Beverly Blvd., Los Angeles, Calif.

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Blocks.....

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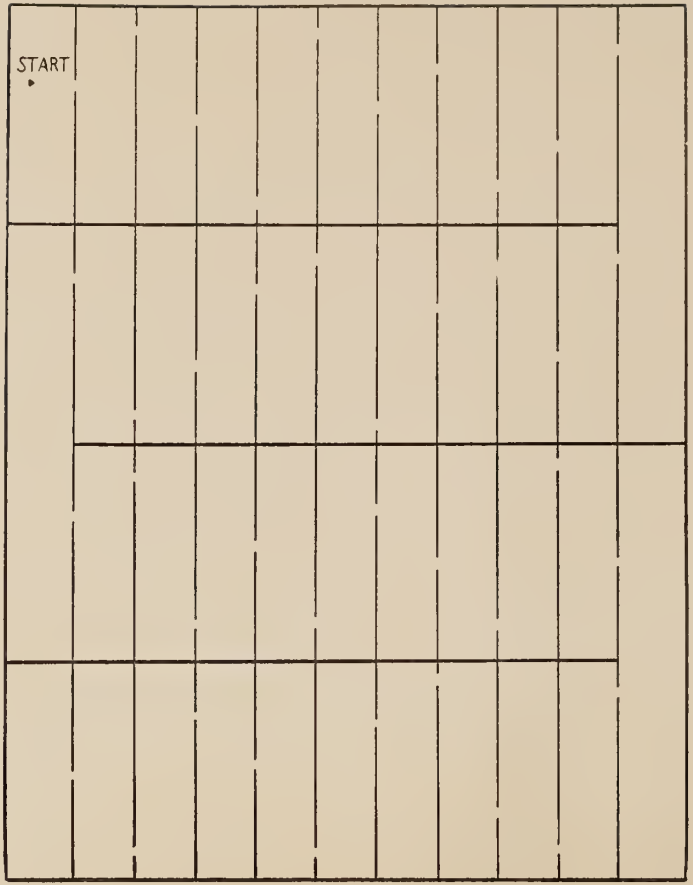

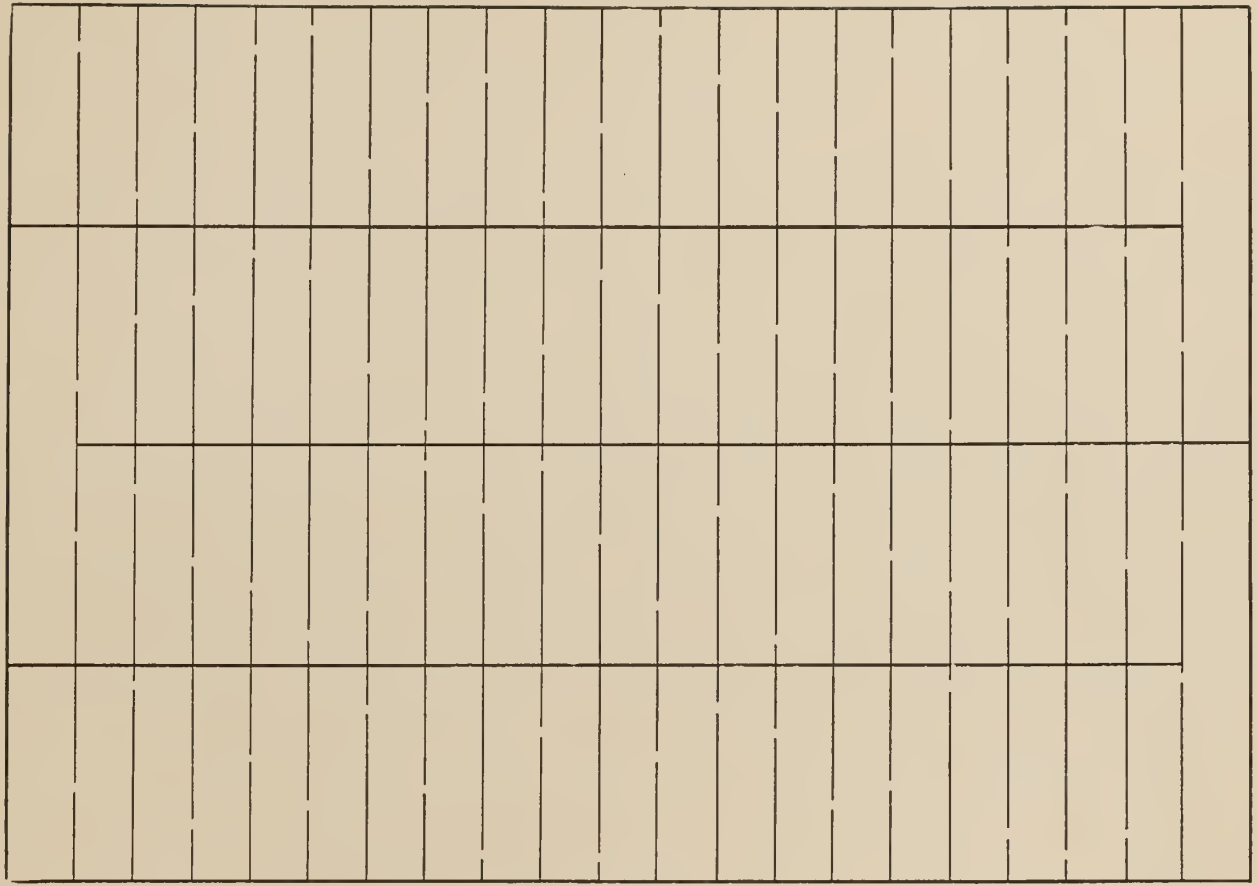

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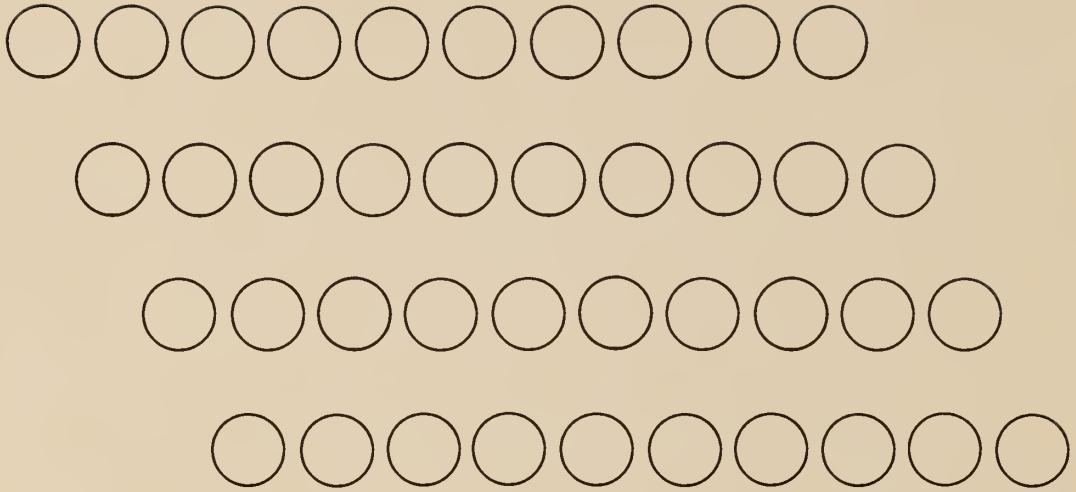

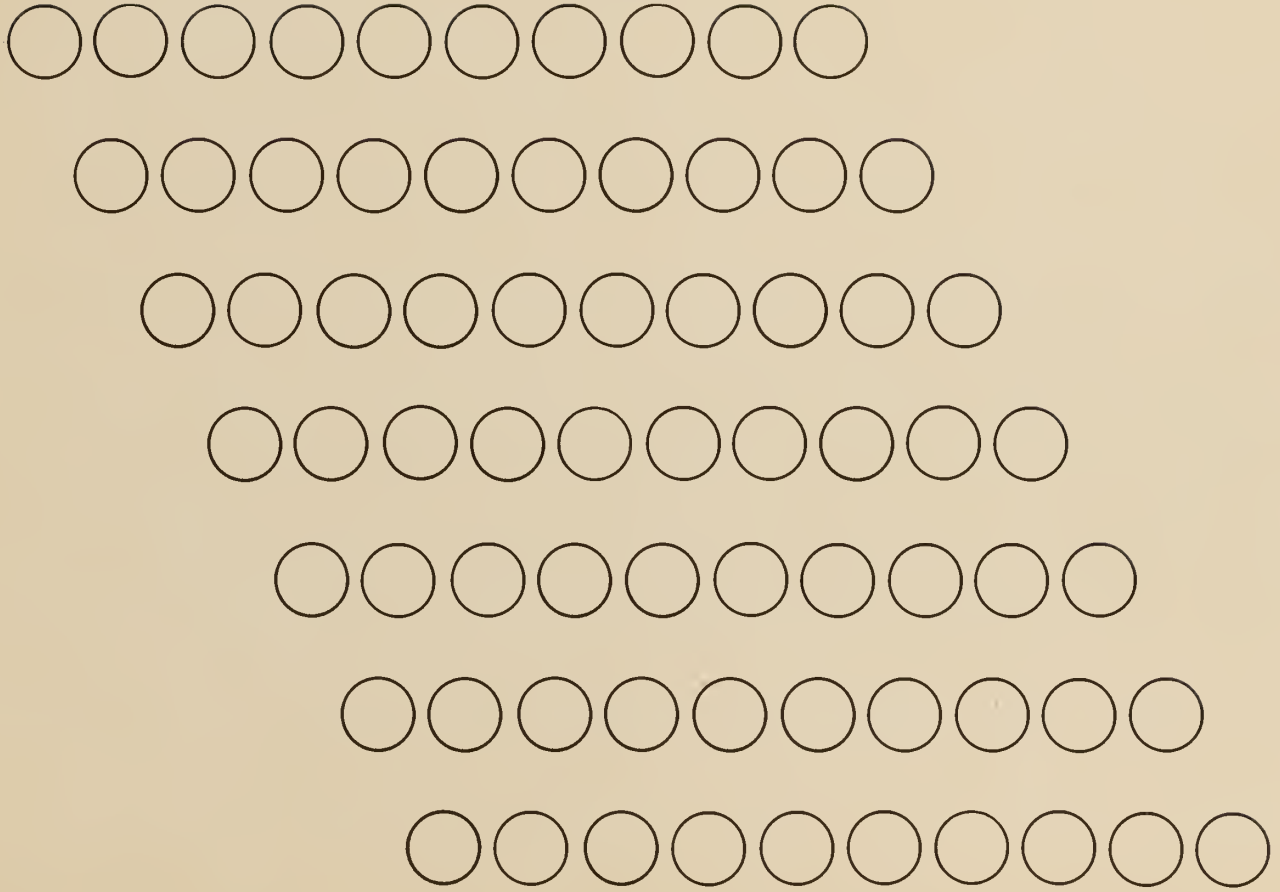

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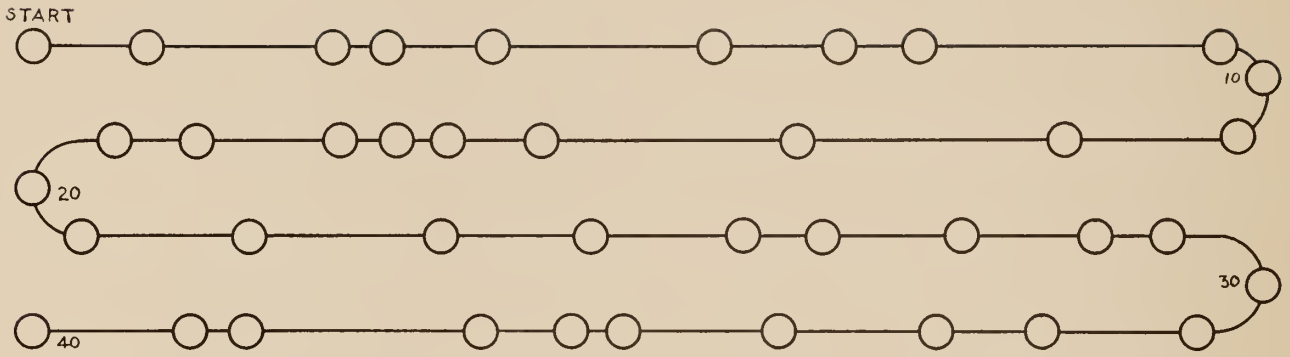

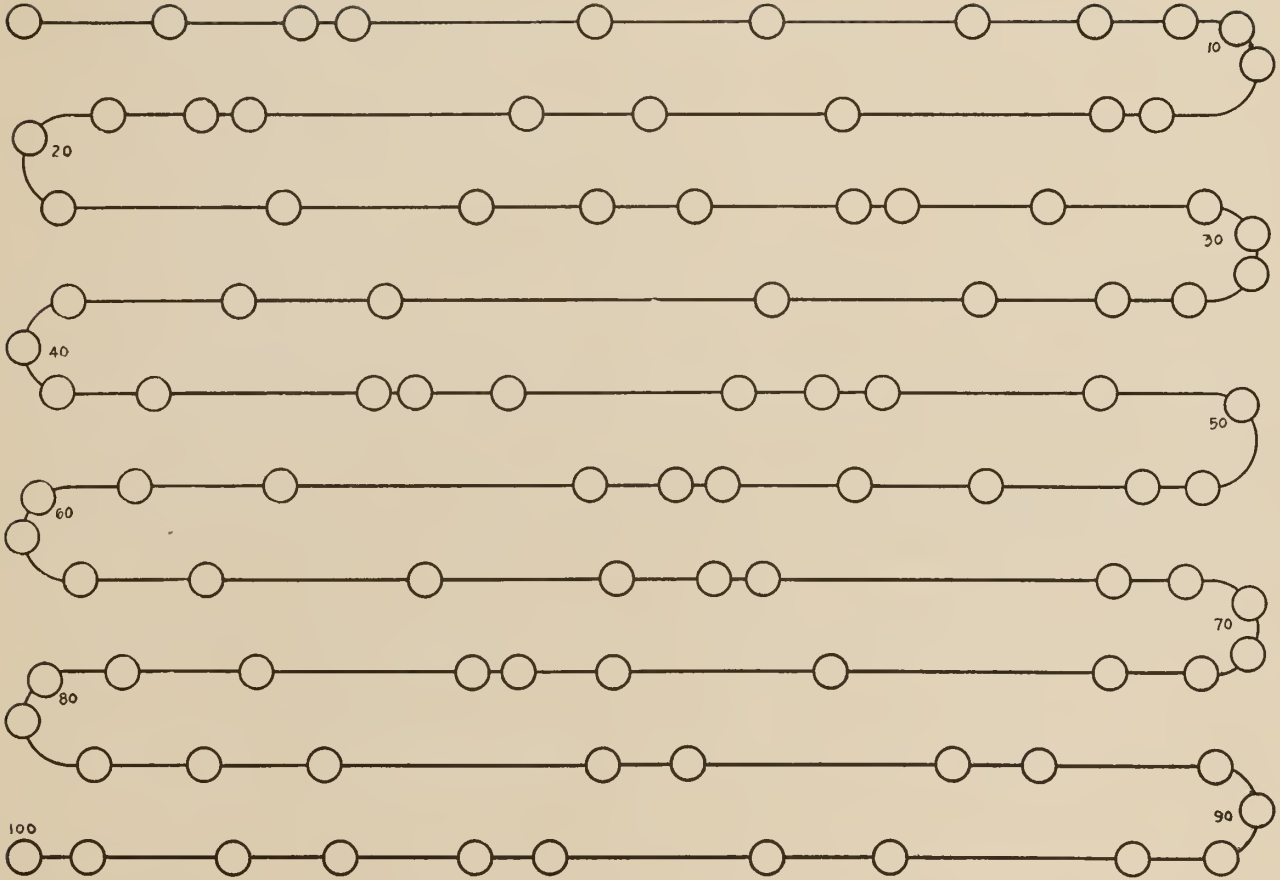

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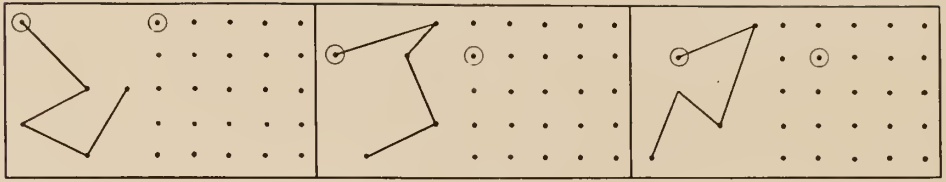

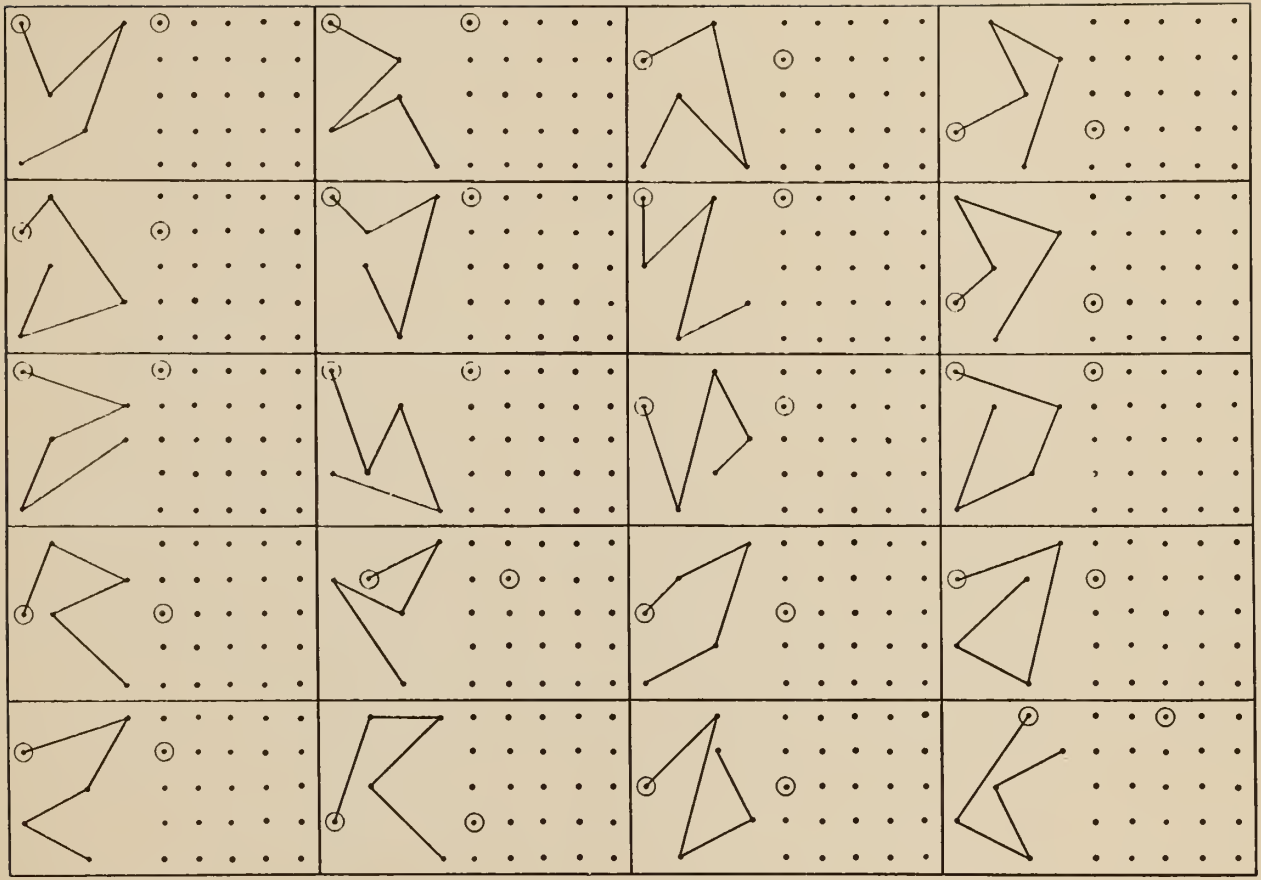

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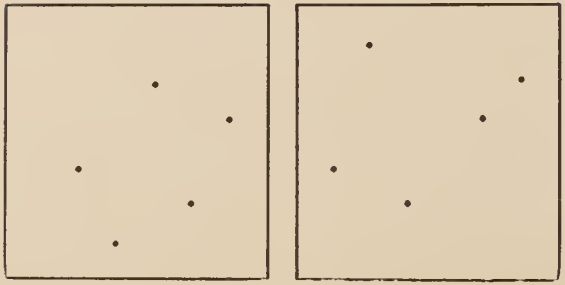

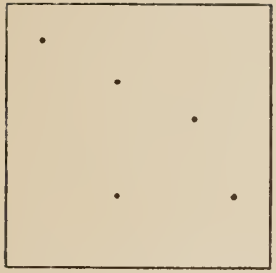

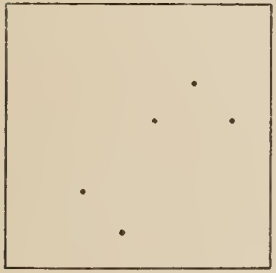

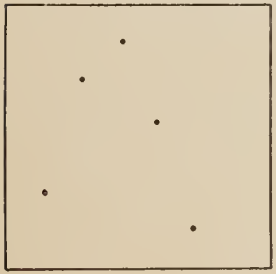

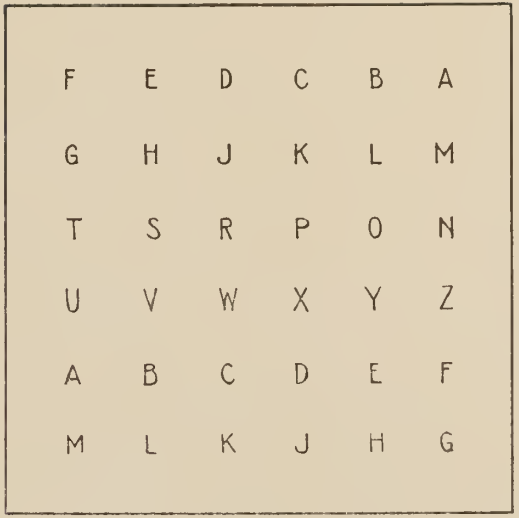

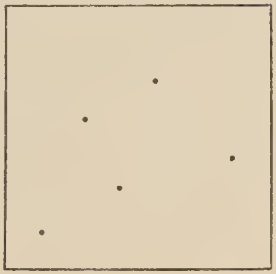

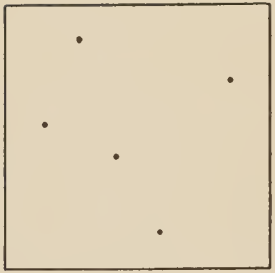

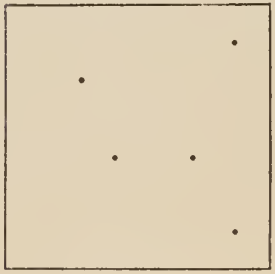

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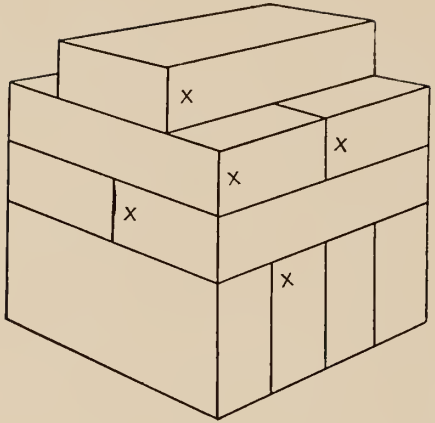

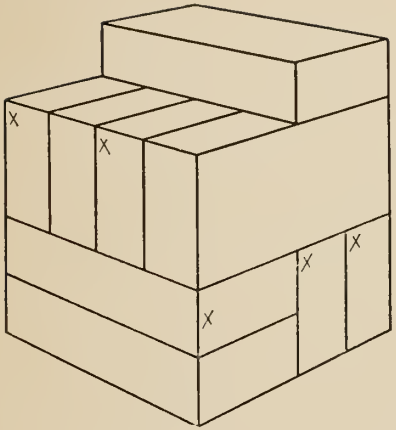

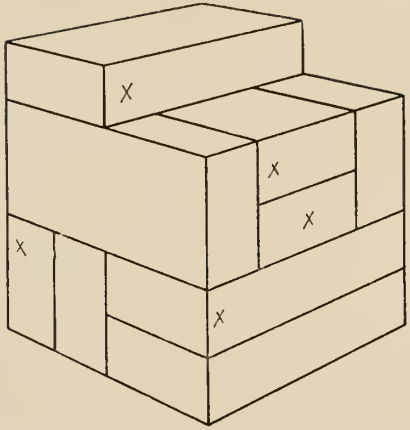

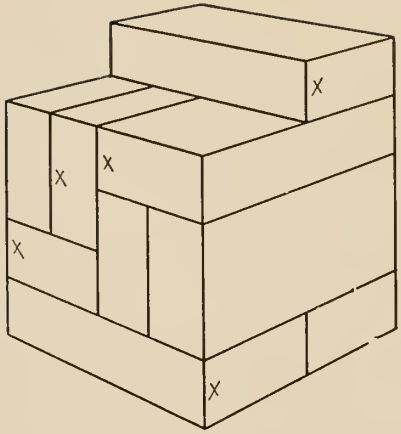

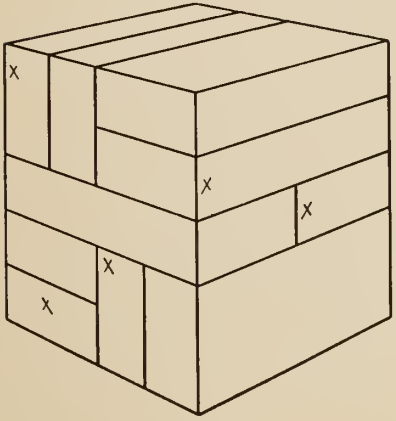

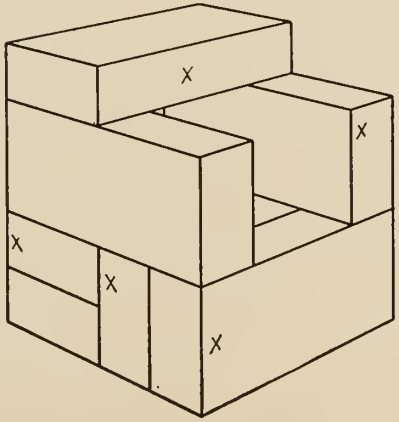

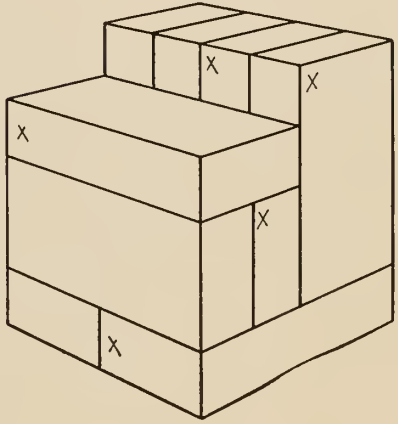

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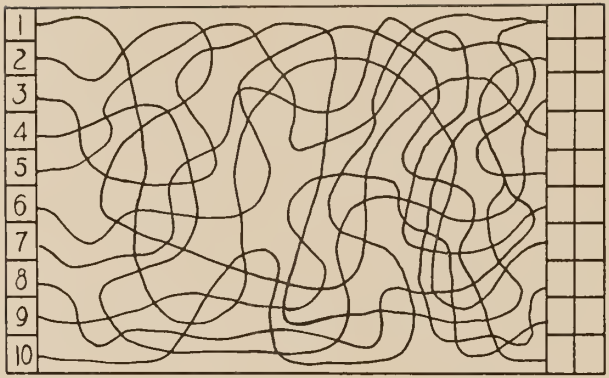
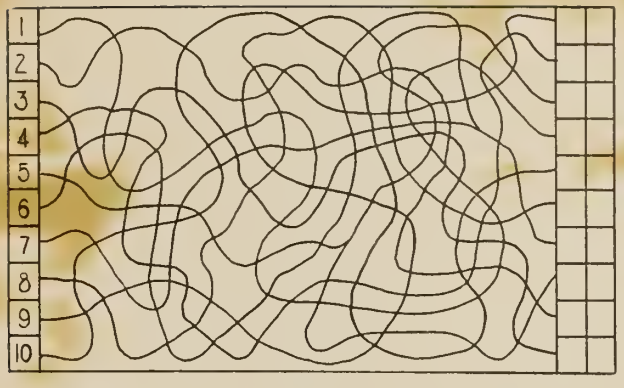
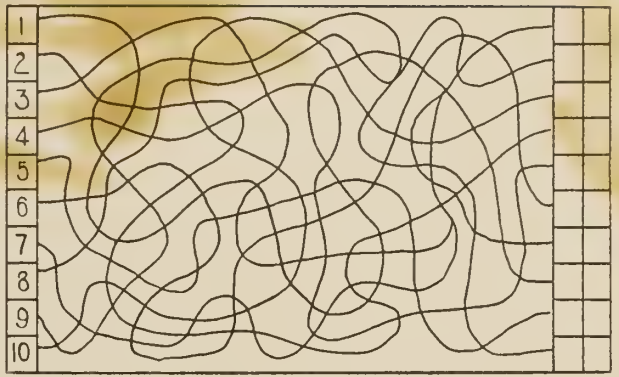
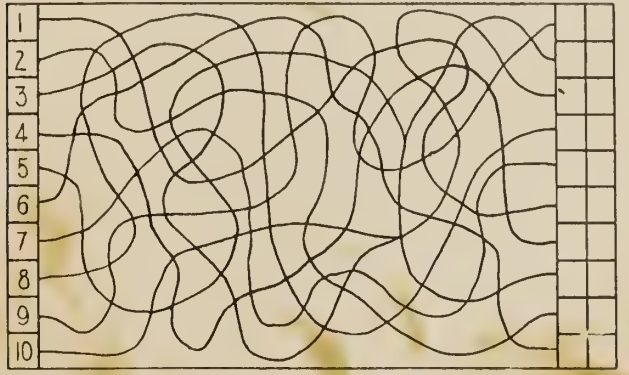
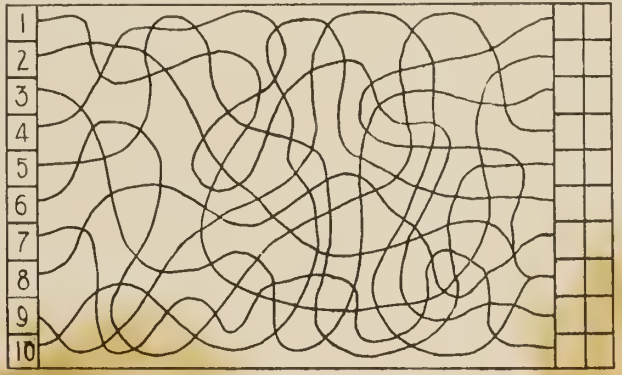
PURSUIT











Score. . . . . .

This booklet is put up in packages of twenty-five, with complete directions, scoring keys, available norms, etc. The price is $1.50 per package, f.o.b. Los Angeles. Checks should accompany all orders from individuals.

A tryout package of five copies of the test with complete directions will be mailed to any address upon receipt of fifty cents.

Published by
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Finishing Time	
Starting Time	
Total Time	
Total Error Score	
Combined Score	
Speed Rating	
Accuracy Rating	
Combined Rating	

THURSTONE EMPLOYMENT TESTS

By L. L. Thurstone
Department of Psychology, Carnegie Institute of Technology

Test	Error Score
1	
2	
3	
4	
5	
6	
7	
8	
Total	

B c

EXAMINATION IN CLERICAL WORK: FORM A

Fill the following blanks, giving your name, age, etc. Do not open or turn over the booklet until you are told to do so.

Name..... Age.....
First name Initial or middle name Last name

Address.....

.....Phone .....

Date.....19.....Nationality.....Church.....

For what position are you applying?.....

Education

What grade did you reach in public school?..... How old were you when you left public school?.....

What courses have you had in business school?

Courses *Time spent*

.....

.....

.....

.....

How old were you when you left business school?.....

Employment

Are you now employed?.....If not, how long is it since you have worked? .....

Name of firm where last (or now) employed.....Line of business .....

Address of firm.....Phone.....

Kind of work done.....How long employed? .....

Why did you leave?.....

Name of firm where employed just previously.....Line of business .....

Address of firm.....Phone.....

Kind of work done.....How long employed?.....

Why did you leave?.....

Experience

How long have you worked at:

Stenography?.....Dictaphone?.....Typing?.....

Filing?.....Bookkeeping?.....Mimeographing?.....

Multigraphing?.....Other machines?.....

.....

References

Give the names and addresses of two or more persons who know you well.

.....

.....

When you have finished filling the blanks on this page, show your paper to the examiner. Do not begin the examination until you are told to do so.

Both speed and accuracy are important in this examination. In general, each error counts the same as one minute of time. Gauge your speed accordingly.

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Test 1

This is a test of concentration in checking for errors. Put a small check mark after each mistake.

Both speed and accuracy are important.

17 + 4 = 21	14 − 2 = 12	5 + 16 = 21	17 + 3 = 20
13 + 3 = 10	9 + 16 = 25	16 − 9 = 7	15 − 4 = 11
13 − 7 = 6	15 + 3 = 18	8 + 14 = 22	15 − 7 = 8
12 + 7 = 19	16 − 3 = 13	12 − 6 = 6	12 + 4 = 16
11 − 5 = 6	12 − 8 = 4	3 + 12 = 15	12 − 5 = 7
5 + 11 = 16	19 + 2 = 22	15 − 2 = 13	12 − 9 = 3
8 + 12 = 20	3 + 15 = 18	13 + 6 = 19	2 + 11 = 13
12 − 3 = 9	2 + 15 = 17	15 + 5 = 10	17 − 2 = 15
18 + 2 = 20	14 + 6 = 20	12 + 2 = 14	19 − 3 = 16
18 − 3 = 15	2 + 17 = 19	5 + 17 = 22	19 + 5 = 24
12 + 5 = 17	16 − 7 = 11	7 + 11 = 18	18 − 9 = 18
17 − 9 = 8	14 + 4 = 18	4 + 18 = 22	18 − 8 = 10
6 + 15 = 22	14 − 7 = 8	18 + 8 = 26	5 + 15 = 20
11 + 4 = 14	14 + 3 = 17	16 − 5 = 11	19 − 6 = 13
12 − 7 = 5	11 − 6 = 5	11 − 3 = 8	16 + 4 = 22
13 − 8 = 5	8 + 15 = 23	17 + 7 = 23	13 − 4 = 9
9 + 12 = 21	11 + 9 = 20	2 + 16 = 18	16 + 6 = 22
17 − 5 = 12	17 − 6 = 11	14 − 8 = 6	19 − 7 = 13
15 + 9 = 25	9 + 18 = 27	13 + 8 = 21	7 + 19 = 26
13 − 9 = 4	17 − 8 = 9	9 + 17 = 26	3 + 18 = 21
4 + 14 = 18	19 + 9 = 28	15 − 6 = 9	18 − 5 = 13
18 − 6 = 12	15 − 9 = 6	2 + 13 = 15	14 + 9 = 23
7 + 16 = 23	16 − 8 = 8	18 − 7 = 11	13 − 2 = 11
11 − 9 = 2	5 + 13 = 18	15 + 7 = 22	16 − 4 = 12
11 − 8 = 3	15 − 8 = 7	19 − 9 = 10	11 − 2 = 9
16 + 8 = 24	13 − 5 = 8	19 − 4 = 15	13 − 3 = 16
13 − 6 = 7	14 − 6 = 8	3 + 14 = 17	19 − 2 = 17
11 − 7 = 4	17 + 2 = 19	14 − 5 = 9	14 − 9 = 5
11 + 6 = 17	18 − 4 = 12	18 + 5 = 23	7 + 18 = 25
14 − 3 = 9	6 + 13 = 19	17 − 3 = 14	4 + 19 = 23

Score .....

Test 2

B c

In the following paragraphs **you are to underscore every word that is incorrectly spelled,** as in the following example: Al of us are takin the test. Both speed and accuracy are important.

The question of mental efficiensy is in the air. It touches you nearly. Your conscience tells you that your mind is less active and less enformed than it might be. You sudenly spring up from the garden-seat, and you say to yourself that yue will take your mind in hand and do something with it. Wait a moment. Be so good as to sink back into that garden-seat and clutch that tennis racket a little longer. You have had these "hours of insight" befor, you know. You have not arrived at the age of thirtie without having tried to carry out noble resolusions,—and failed. What precautions are you going to take against failere this time? For your will is probebly no stronger now than it was before. You have admitted and acepted failure in the past. And no wound is more cruel to the spirit of resolv than that delt by failure. You fancy the wound closed, but just at the critical moment it may reopen and mortally blead you. What are your precautions? Have you thought of them? No. You have not.

I have not the pleasure of your aquaintance. But I know you because I know myselve. Your failure in the past was due to one or more of three cauces. And the first was that you undertook too much at the beginning. You started off with a magnificent program. You are something of an expert in physical exersices—you would be ashamed not to be, in these physical days—and so you would never attempt a hurdle race or an uninterrupted hour's club-whirling without some preparation. The analogy between the body and the mind out to have struck you. This time, please do not form an elaberate program. Do not form any program. Simply content yourself with a preliminery canter. For example (and I give this merely as an exampel), you might say to yourself: "Within one month from this date I will read twice Herbert Spencer's little book on 'Education' and will make notes in pencil inside the back cover of the things that particilarly strike me." You remark that that is nothing. Well, do it. When it is done you will at any rate possess the satisfaction of having resolved to do something and having donc it. Your mind will have gained tone and healthy pride. You will be even justified in setting yourself some kind of simpl program to extend over three months. And you will have acquired some general principals by the light of which to construct the program. But best of all, you will have avoided failure, that dangerous woond.

The second posible cause of previous failure was the disintegrating effect on the will-power of the irionic, superior smile of friends. Whenever a man "turns over a new leaf" he has this insane gigle to face. The drunkard may be less ashamed of getting drunk than of breaking to a crony the news that he has signed the pledge. Strange, but true! And human natur must be counted with. Of course, on a few stern spirits the effect of that smile is merely to harden the resolusion. But on the majority its influense is deleterious. Therefore don't raise any flag. Say nothing. Work as unobtrusively as you can. When you have won a battle or two you can begin to wave the banner, and then you will find that that miserable, pitiful, ironic, superior smile will die away erre it is born.

The third possible cause was that you did not re-arange your day. Idler and time-waster though you have been, stil you had done something during the twenty-four hours. You went to work with a kind of dimm idea that there were twenty-six hours in every day. Something large and definite has to be dropped. Some space in the rank jungle of the day has to be cleered and swept up for the new operations. Robbing yourself of sleep won't help you, nor trying to "squeese in" a time for study between two other times. Use the knife, and use it freely. If you mean to read or think half an hour a day, arrange for an hour. A hundred per cent margin is not to much for a beginner. Do you ask me where the knife is to be used? I should say that in nine cases out of ten the rites of the cult of the body might be abreviated. I resently spent a week-end in a London suburb, and I was staggered by the wholesale attention given to physical rekreation in all its forms. It was a gigantic debauch of the muscles on every side. It shocked me. "Poor withering mind!"

Adapted from "Mental Efficiency" by Arnold Bennett.

Score .....

Test 3

In the following list of letters you are to draw a line through the letters X, Z, U, and C, but not through any other letters. Both speed and accuracy are important.

J I K A X W H L B Y M G Z V C N U F O D P E Q R T S C W E V
O A N X M U D L P Y K T E Q F R I Z C S H Y D X C O W B Z P
N E V A M Q F U R L G S H K T I J E T D P S C O B R N Q A U
M F V L W G X H Y K I Z J O F M E U Q B N V L A T G C P K R
J W D H S I Z X Y W X J V K I U Y A T H L Z D S G M C R F N
D O E Q P M V C W L U B K N D X T A O J Y E Z P S F R Q G H
I Q I H P A R G J O B K S Z F N T L C X M U E Y W D V Q E N
D M Z P L C Y F X Q K G U R B W H S I T A V J K A U J T L I
S B R V H M W Q C X G N P D Y F O Z E P M N B O L A K J C Q
I Z D Y H X E R V F W U G S T S H R G Q F I T P E J D O C K

Test 4

1	2	3	4	5	6	7	8	9	0
C	J	L	S	T	U	V	X	Z	O

Each figure in the above list is indicated by a letter. Discover which letter is used for each figure. Then write the proper numbers in the blank spaces below. The first two numbers are already filled in correctly. Both speed and accuracy are important.

C Z J T	*1*	*9*	*2*	*5*	T V J L					S O C J				
J O V S	*2*	*0*	*7*	*4*	J O C X					L Z J Z				
T V L O					U C V T					V L X S				
C X T O					S O J Z					T Z C O				
V U O S					T X L X					Z J T O				
J S U L					S C S Z					X O T J				
Z S Z C					V X J X					U V C X				
X L T U					U J C L					T X T L				
V U C O					S V T O					S V U V				
J U X L					U L C S					Z U O S				
Z C Z U					J Z T V					L Z T V				
U Z L O					L U J O					S X C U				

Score (Test 3) .....

Score (Test 4) .....

Test 5

B c

Below is a list of names of men followed by the cities in which they live. You are to write the names of the men in the blank spaces under their respective cities. Write the names under each city in alphabetical order. Both speed and accuracy are important.

Name	City
Black,	Chicago
Everett,	Baltimore
Ward,	Buffalo
Smith,	Philadelphia
Thompson,	Minneapolis
Dixon,	Pittsburgh
Barton,	Rochester
Mayer,	Boston
Newton,	New York
Murphy,	St. Paul
Johnson,	Pittsburgh
Thomas,	Philadelphia
Wells,	St. Paul
Howard,	Buffalo
Lawrence,	Chicago
Palmer,	Baltimore
Scott,	Boston
Duffy,	Minneapolis
Henderson,	New York
Schwartz,	Minneapolis
Hyde,	Chicago
Beck,	Baltimore
Watkins,	St. Paul
Barrett,	Buffalo
Phillips,	Philadelphia
Rogers,	Rochester
Lloyd,	Boston
Williams,	Pittsburgh
Dewey,	Minneapolis
Martin,	Chicago
Moore,	Philadelphia
Carter,	Rochester
Evans,	Pittsburgh
Foster,	Minneapolis
Jones,	St. Paul
Custer,	New York
Taylor,	Baltimore

Baltimore	New York
Boston	Philadelphia
Buffalo	Pittsburgh
Chicago	Rochester
Minneapolis	St. Paul

Number of lists wrong ..... × 3 = *Score* .....

Test 6

In the column marked 1 put a check mark opposite every fire or accident insurance policy of $1500 to $4500 inclusive, issued between March 15, 1916, and May 10, 1917.

In the column marked 2 put a check mark opposite every life or accident insurance policy up to and including $3000, issued between October 15, 1916, and August 20, 1917.

In the column marked 3 put a check mark opposite every fire or life insurance policy of $2000 to $5000 inclusive, issued between February 10, 1916, and June 15, 1917.

Both speed and accuracy are important.

Amount of Insurance	Kind of Insurance	Date	1	2	3
$3000	Fire	Jan. 2, 1917			
$1000	Life	Oct. 22, 1916			
$4000	Accident	Sept. 14, 1916			
$2000	Life	Nov. 13, 1917			
$4000	Fire	May 17, 1917			
$3000	Accident	Oct. 12, 1916			
$5000	Life	Feb. 16, 1917			
$1000	Fire	Aug. 3, 1917			
$4000	Fire	Aug. 11, 1917			
$2000	Accident	May 21, 1916			
$5000	Life	March 9, 1916			
$3000	Fire	July 17, 1917			
$1000	Accident	June 4, 1917			
$1000	Life	Nov. 23, 1917			
$5000	Life	April 18, 1916			
$2000	Accident	Dec. 24, 1917			
$5000	Accident	April 19, 1916			
$2000	Life	Dec. 7, 1917			
$4000	Fire	May 26, 1916			
$3000	Accident	Jan. 6, 1917			
$5000	Life	March 29, 1916			
$3000	Life	June 28, 1916			
$4000	Accident	Feb. 8, 1917			
$1000	Fire	July 27, 1916			
$2000	Accident	Jan. 21, 1917			

Score . . . . . .

Test 7

B c

Solve the following problems. Use the blank space below for figuring.
Both speed and accuracy are important.

ANSWER

1. $3 + 26 + 28 + 68 + 1900 + 1$ .....(.....)
2. $3 \times 19 \times 1 \times 14$ .....(.....)
3. $4.3682 + 0.0028 - 1.992 + 34. + 9.92$ .....(.....)
4. $\frac{3}{4} + \frac{1}{8} + \frac{1}{32} - \frac{4}{8} + \frac{1}{2}$ .....(.....)
5. $\frac{1}{3} + \frac{2}{5} - \frac{3}{15} + \frac{2}{3} + \frac{1}{5}$ .....(.....)
6. Add the following lengths: 2 ft. 3 in. + 4 ft. 11 in. + 8 in. + 6 ft. 6 in. .....(.....)
7. Add the following: 6 yr. 2 mo. + 4 yr. 1 mo. + 8 yr. 10 mo. + 4 mo. .....(.....)
8. How much is 16% of $482.14? .....(.....)
9. $13 \times 2.39 \times 0.024$ .....(.....)
10. $\frac{456.3}{0.89}$ (Carry to two decimal places) .....(.....)
11. Add the following: 5 min. 13 sec. + 6 min. 49 sec. + 14 sec. .....(.....)
12. What is 86% of $482.14? .....(.....)

Turn to the next page.

Number of problems wrong ..... × 3 = *Score*.....

Test 8

Put on the blank space preceding each Arabian proverb the number of the English proverb to which it corresponds in meaning, as indicated in the sample at *4*.

Both speed and accuracy are important.

English Proverbs	Arabian Proverbs
(1) An old dog will learn no tricks.	*4* Strike while the iron is hot.
(2) Ill nature needs no tutor.	.....A spark may start a great fire.
(3) A small leak will sink a ship.	.....The best fish swim near the bottom.
(4) Sail when the wind blows.	.....Let the cobbler stick to his last.
(5) Nightingales can sing their own song best.	.....Little dogs bark the most.
(6) A poor cask may hold good wine.	.....An ounce of prevention is worth a pound of cure.
(7) Count not your chickens before they are hatched.	.....Bend the willow while it is young.
(8) A stitch in time will save nine.	.....Weeds need no sowing.
(9) Don't put all your eggs in one basket.	.....Catch the bear before you sell his skin.
(10) Shallow brooks are noisy.	.....A royal heart is often hidden under a tattered cloak.
(11) The sweetest grapes hang highest.	.....The rat that has but one hole is soon caught.

Just as soon as you have finished, give your paper to the examiner.

Score .....

B c

THURSTONE EMPLOYMENT TESTS

By L. L. Thurstone
Department of Psychology, Carnegie Institute of Technology

DIRECTIONS AND KEY FOR EXAMINATION IN CLERICAL WORK: FORM A

Purpose of the Examination

When hiring office clerks the interviewer is often uncertain as to the caliber of the applicant and the nature of the work for which he or she is best adapted. This clerical examination is intended to serve as a supplement to the interview in order to determine at least roughly the applicant's general intelligence as well as his accuracy and speed in doing clerical tasks. The several parts of the examination are sample clerical tasks. The last part of the test is a generally accepted intelligence test. It has been experimentally verified that an employment interviewer can make a better prediction about the applicant if he is aided by this clerical examination than if he is compelled to give his judgment of the applicant entirely on the basis of an interview.

How to Give the Examination

Select for the applicant a quiet table where he may work without being disturbed. Give him a copy of the Examination in Clerical Work and ask him to fill out the blanks on the first page and show you the paper. When the applicant has properly filled the blanks, record the "Starting Time" in the space provided in the upper left-hand corner of the first page. Tell the applicant to proceed with the examination, following the directions on each page. Tell him to return the booklet to you or your assistant when he has finished. When the applicant returns the booklet, record his "Finishing Time."

How to Score the Examination

The score in each test is expressed in terms of errors. The Error Score in each test is found by adding the points given for errors as follows:

Test 1, 1 point for each misplaced or omitted check mark.

Test 2, 1 point for each misplaced or omitted underscoring.

Test 3, 1 point for each misplaced or omitted cancellation.

Test 4, 1 point for each number not exactly reproduced. (A number consists of 4 figures. Only 1 point can be counted for error in 1 number, whether 1, 2, 3, or all 4 figures are wrong.)

Test 5, 3 points for each of the 10 city lists incorrect. (Any list is incorrect in which there is a wrong, misplaced, omitted, or misspelled name.)

Test 6, 1 point for each misplaced or omitted check mark.

Test 7, 3 points for each incorrect, incomplete, or omitted answer.

Test 8, 1 point for each proverb not numbered or incorrectly numbered.

The Error Score in each test is entered in the lower corner of the test page. These error scores are then copied into the spaces provided in the upper right-hand corner of the first page and added to find the Total Error Score in the Examination.

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How to Interpret the Results of the Examination

Provision is made for finding the rating of an applicant separately in accuracy and speed and also in a combination of speed and accuracy. Since speed is of little value without accuracy, the applicant will generally be judged by the rating in speed and accuracy combined.

The **Accuracy Rating** is obtained from the Error Score by means of Table 1. Thus, if an applicant's Error Score is 15, this would be included within the interval from 13 to 22 as given in the table, and the letter rating corresponding to this interval is B, which is a superior rating in accuracy. Other Error Scores are evaluated as Accuracy Ratings in the same manner.

The **Speed Rating** is obtained in a similar manner from the Total Time in minutes required for the Examination. (See Table 2.) Thus, a Total Time of 65 minutes gives a Speed Rating of C (Average).

The **Combined Speed-and-Accuracy Rating** is obtained as follows: Add together the Error Score and Total Time for the Examination to find a **Combined Error-and-Time Score.** Find the corresponding Combined Speed-and-Accuracy Rating from Table 3. Thus, a Combined Error-and-Time Score of 120 gives a Combined Speed-and-Accuracy Rating of D (Inferior).

Tables for the Interpretation of Scores in the Examination

Table 1

Error Score	Accuracy Rating	Interpretation
0–12	A	Very Superior
13–22	B	Superior
23–42	C	Average
43–62	D	Inferior
63 or more	E	Very Inferior

Table 2

Total Time	Speed Rating	Interpretation
49 or less	A	Very Superior
50–59	B	Superior
60–71	C	Average
72–79	D	Inferior
80 or more	E	Very Inferior

Table 3

Combined Error-and-Time Score	Combined Speed-and-Accuracy Rating	Interpretation
71 or less	A	Very Superior
72–87	B	Superior
88–111	C	Average
112–131	D	Inferior
132 or more	E	Very Inferior

EXAMINATION IN CLERICAL WORK: FORM A: KEY

Test 2

B c

efficiensy
enformed
yue
sudenly
befor
thirtie
resolusions
failere
probebly
acepted
delt
blead
aquaintance
myselve
cauces
exersices
out
elabera
preliminery
exampel
particilarly
simpl
principals
woond
posible
irionic
gig
natur
resolusion
influense
erre
re-arange
stil
dimm
cleered
squeese
to
abreviated
resently
rekreation

Test 3

Tear off this page here.

| | | |

6	2	1	2
9	9	2	9
7	4	8	4
2	0	9	7
1	0	1	5
8	0	5	9
10	2	5	8
5	8	7	6
11	3	5	8
3	7	6	4
	4	7	9
	7	5	3
	9	5	2
	6	7	4

Test 5 *(Each error counts 3)*

Baltimore	Beck	Custer	New York
	Everett	Henderson	
	Palmer	Newton	
	Taylor		
Boston	Lloyd	Moore	Philadelphia
	Mayer	Phillips	
	Scott	Smith	
		Thomas	
Buffalo	Barrett	Dixon	Pittsburgh
	Howard	Evans	
	Ward	Johnson	
		Williams	
Chicago	Black	Barton	Rochester
	Hyde	Carter	
	Lawrence	Rogers	
	Martin		
Minneapolis	Dewey	Jones	St. Paul
	Duffy	Murphy	
	Foster	Watkins	
	Schwartz	Wells	
	Thompson		

Test 6

	1	2	3
	✓		✓
	✓		✓
	✓	✓	
	✓		
		✓	
	✓		✓
	✓		
	✓		✓
	✓		✓
	✓		✓

Test 7
(Each Error counts 3)

9606	6	4	3
867	7	2	9
6679	4	9	6
29/32	0	3	8
1 2/5	4	0	6
14 ft., 4 in.	3	6	4
49 yrs., 5 mo.	1	9	4
4147	6	5	8
7.727 or	3	1	5
969.515	8	8	2
8934.7	5	7	1
$77.14	0	2	8
14 ft., 4 in.	4	9	4
5/2 1	9	8	0
28/32	5	9	0
6679	8	1	3
867	7	3	8
9606	2	9	5

Test 8

3	4	7	6
	9	6	0
	4	7	6
	5	8	5
	6	7	1
	8	0	5
	9	2	5
	7	0	5
	5	9	1
	4	0	2
	3	9	2
	2	0	1
	1	8	5
	0	9	3
	3	8	4
	2	9	5
	1	8	4
	0	9	7
	4	6	3
	5	8	3
	6	7	4
	7	6	0
	8	5	1
	9	4	2
	10	3	3
	11	2	4
	12	1	5
	13	0	6
	14	9	7
	15	8	8
	16	7	9
	17	6	0
	18	5	1
	19	4	2
	20	3	3

Test 4

5	7	2	3
2	0	1	8
6	1	7	5
4	0	2	9
5	8	3	8
4	1	4	9
7	8	2	8
6	2	1	3
4	7	5	0
6	3	1	4
2	9	5	7
3	6	2	0

5	7	3	0
1	8	5	0
7	6	0	4
2	4	6	3
9	4	9	1
8	3	5	6
7	6	1	0
2	6	8	3
9	1	9	6
6	9	3	0

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B d

MINNESOTA VOCATIONAL TEST FOR CLERICAL WORKERS

(Arranged by Dorothy M. Andrew under the direction of Donald G. Paterson and Howard P. Longstaff)

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Name_____ Date_____

TEST 1—Number Comparison	TEST 2—Name Comparison
Number Right_____	Number Right_____
Number Wrong_____	Number Wrong_____
Score = R—W_____	Score = R—W_____
Percentile Rating_____	Percentile Rating_____

Instructions

On the inside pages there are two tests. One of the tests consists of pairs of names and the other of pairs of numbers. If the two names or the two numbers of a pair are *exactly the same* make a check mark (√) on the line between them; if they are *different,* make no mark on that line. When the examiner says "Stop!" draw a line under the last pair at which you have looked.

Samples done correctly of pairs of *Numbers*

79542		79524
5794367	√	5794367

Samples done correctly of pairs of *Names*

John C. Linder		John C. Lender
Investors Syndicate	√	Investors Syndicate

Now try the samples below.

66273894		66273984
527384578		527384578
New York World		New York World
Cargill Grain Co.		Cargil Grain Co.

This is a test for Speed and Accuracy. Work as fast as you can without making mistakes.

Do not turn this page until you are told to begin.

Printed in U. S. A.

Test 1

√ Check if the two numbers are the same.

1. 307———309
2. 4605———4603
3. 976———996
4. 101267———101267
5. 3065432———30965432
6. 103345700———103345700
7. 46754———466754
8. 3367490———3367490
9. 2779———2778
10. 57394———57394
11. 63801829374———63801839474
12. 283577657———283577657
13. 75689———75689
14. 2547892026———2547893026
15. 336354———336254
16. 998745732———998745733
17. 623———623
18. 263849102983———263849102983
19. 5870———5870
20. 379012———379012
21. 8734629———8734629
22. 2549806746———2549806746
23. 57802564———57892564
24. 689246———688246
25. 1578024683———1578024683
26. 582039485618———582039485618
27. 63829172630———63829172639
28. 592———592
29. 829374820———829374820
30. 62937456———63937456
31. 8293———8293
32. 6382910293———6382910292
33. 781928374012———781928374912
34. 68293———68393
35. 18203649271———18293649271
36. 4820384———4820384
37. 283019283745———283019283745
38. 73927102———73927102
39. 91029354829———91029354829
40. 38291728———38291728
41. 6283910293———6283910203
42. 392018273648———392018273848
43. 820———829
44. 572937273———572937373
45. 7392———7392
46. 8172036———8172036
47. 68391028364———68391028394
48. 48293———48292
49. 739201———739201
50. 62839201———62839211
51. 5829———5820
52. 192836472829———192836472829
53. 362———362
54. 2039271827———2039276837
55. 73829———73829
56. 82739102837———82739102837
57. 48891028———48891028
58. 7291728———7291928
59. 172839102839———172839102839
60. 628192———628102
61. 473829432———473829432
62. 478———478
63. 372816253902———372816252902
64. 64829———64830
65. 4739210249———4739210249
66. 748362———748363
67. 728354792———728354772
68. 3927———3927
69. 927384625———927384625
70. 4628156———4628158
71. 6382———6392
72. 12937453829———12937453829
73. 523———533
74. 7263920———7263920
75. 74293———74293
76. 82734291———82734271
77. 2739102637———2739102637
78. 62810263849———62810263846
79. 638291———638291
80. 62831027———62831027
81. 527———529
82. 172438291026———172438291026
83. 7253829142———725382942
84. 836287———836289
85. 62435162839———62435162839
86. 6254———6256
87. 6241526———6241526
88. 1426389012———1426389102
89. 825———825
90. 67253917287———67253917287
91. 6271———6271
92. 263819253627———263819253629
93. 82637———82937
94. 728392736———728392736
95. 62739———62739
96. 728352689———728352688
97. 463728———463728
98. 73829176———73827196
99. 4825367———4825369
100. 56382018———56382018

B d

√ Check if the two numbers are the same.

101. 789———789
102. 819263728192———819263728172
103. 682537289———682537298
104. 7245———7245
105. 82936542891———82936542891
106. 4738267———4738277
107. 63728———63729
108. 6283628901———6283628991
109. 918264———918264
110. 263728192037———263728192073

111. 52839102738———5283910238
112. 6283———6282
113. 7283529152———7283529152
114. 208———298
115. 82637201927———8263720127
116. 15273826———15273826
117. 72537———73537
118. 726391027384———726391027384
119. 627389———627399
120. 725382910———725382910

121. 46273———46273
122. 629———620
123. 7382517283———7382517283
124. 637281———639281
125. 2738261———2728261
126. 627152637490———627152637490
127. 73526189———73526189
128. 5372———5392
129. 63728142———63728124
130. 4783946———4783046

131. 82637281028———82637281028
132. 628———628
133. 7293728172———7293728177
134. 7362———7362
135. 927382615———927382615
136. 85345———85345
137. 895643278———895643277
138. 726352———726353
139. 7263524———7263524
140. 632685———632685

141. 273648293048———273648293048
142. 634———634
143. 7362536478———7362536478
144. 7362———7363
145. 7362819273———7362819273
146. 63728———63738
147. 63728192637———63728192639
148. 728———738
149. 62738291527———62738291529
150. 63728192———63728192

151. 73526———73526
152. 7283627189———7283627189
153. 627———637
154. 728352617283———728352617282
155. 6281———6381
156. 936271826———936371826
157. 82637192037———82637192037
158. 527182———527182
159. 6273———6273
160. 726354256———72635456

161. 725361552637———725361555637
162. 7526378———7526377
163. 685———685
164. 82637481028———82637481028
165. 3427———3429
166. 827364933251———827364933351
167. 63728———63728
168. 6273846273———6273846293
169. 62836———6283
170. 2638496———2638496

171. 738291627874———738291627874
172. 62836454———62836455
173. 42738267———42738269
174. 573829———573829
175. 628364728———628364928
176. 725———735
177. 627385———627383
178. 63354———63354
179. 54283902———54283602
180. 7283562781———7283562781

181. 62738———63738
182. 727355542321———72735542321
183. 263849332———263849332
184. 162837———163837
185. 47382912———47382922
186. 628367299———628367399
187. 111———111
188. 11829304829———11828304829
189. 4448———4448
190. 333693678———333693678

191. 3212———3212
192. 27389223678———27389223678
193. 473829———473829
194. 7382937———7383937
195. 3628901223———3628901233
196. 5572867———5572867
197. 87263543———87263543
198. 3678902———3678892
199. 15672839———15672839
200. 9927382———9927382

Test 2

√ Check if the two names are the same.

1.	Hulme Co.——Hulne Co.	51.	Armo Culvert Co.——Armo Culvert & Co.
2.	L. T. Piver——L. T. Piver	52.	Larous & Bro.——Larus & Bro.
3.	Foley & Co.——Foley & Co.	53.	Winstar W. B.——Winster W. B.
4.	Floyd Gibbons——Floyd Gibbens	54.	Bender L. C.——Binder L. C.
5.	Dole Publishing Co.——Dole Publishing Co.	55.	J. C. Andresen Inc.——J. C. Andresen Inc.
6.	Chase Bag Co.——Chase Bag Co.	56.	Vacuum Oil Company——Vacuum Oil Company
7.	Aladdin Co.——Aladdin & Co.	57.	Endicott Co.——Endicott Co.
8.	Arthur Bier & Co.——Arthur Bier Co.	58.	Minneapolis Mf'g. Co.——Minneapolis Mf'g. Co.
9.	Mydall Cain——Mydell Cain	59.	Beverly A. B.——Beverley A. B.
10.	M. C. D. Borden & Sons——M. C. D. Borden & Sons	60.	Jensen & Co.——Jenson & Co.
11.	Midland Nat'l. Bank——Midland Nat'l. Bank	61.	Meumann L. R.——Meumann L. R.
12.	Hixon Lt'd.——Hixon Lt'd.	62.	Stevenson & Co.——Stevenson & Co.
13.	R. Weiner——R. Wiener	63.	Haldoran H. P.——Haldoran H. P.
14.	Pacqueres——Pacqueris	64.	Evers Bros.——Evers Bros.
15.	Ponemah Mills——Ponemah Mills	65.	Nevens Sales Co.——Nevens Sale Co.
16.	Keeley Institute——Keeley's Institute	66.	Outdoor Sign Co.——Outdoor Sign Co.
17.	Jim Pepper——Jim Pepper	67.	Young & Co.——Young & Co.
18.	Pictorial Review——Pictorial Review	68.	Goodyear Tire Co.——Goodyear Tire Co.
19.	Colette Cartier——Colete Cartier	69.	Redford Lb'r. Co.——Redferd Lb'r. Co.
20.	Mayno Salon——Mayno's Salon	70.	Canadian National——Canadian Nat'l.
21.	Glazo Co.——Glazo Inc.	71.	Standard Oil Co.——Standard Oil Co.
22.	Bonne Lee——Bonne & Lee	72.	Valiant Mf'g. Co.——Valant Mf'g. Co.
23.	Vapo Cresolene Co.——Vapo Cresolen Co.	73.	C. Harris——C. Harris
24.	Wiebusch & Helger——Weibusch & Helger	74.	J. Williams Company——G. Williams Company
25.	A. M. Davis——A. M. Davis	75.	Kaufmann A. C.——Kaufman A. C.
26.	Foote Lb'r. Co.——Foot Lb'r. Co.	76.	Frisby N. C.——Frisby N. C.
27.	Lander's——Lander's	77.	Donald T. C.——Donald T. C.
28.	Delle Ross——Dell Ross	78.	Waldo Inc.——Waldo Co.
29.	Savage Rug Co.——Savage Rug Co.	79.	Andres Mfg. Co.——Andres Mfg. Co.
30.	Landon & Warner——Landen & Warner	80.	Oriza Ann Legrand——Oriza Anne Legrand
31.	Dennison's——Dennison's	81.	A. Stein & Company——A. Stien & Company
32.	Piggily Wiggily Co.——Piggily Wiggily Co.	82.	Robert Courtney——Robert S. Courtney
33.	Hurley Machine Co.——Hurly Machine Co.	83.	Leonard Music Co.——Leonard Music Co.
34.	J. Bauer & Black——J. Baeur & Black	84.	George Morgan——George Morgen
35.	Edwin Cigar Co.——Edwin Cigar Co.	85.	Paulson's Cafe——Paulson's Cafe
36.	Vik Oil Co.——Vik Oil Co.	86.	Robert T. Quamme——Robert T. Quame
37.	John Skinner & Sons——John Skinner & Son	87.	Traverse Studio——Traverse Studio
38.	Eagle Pencil Co.——Eagle Pencil Co.	88.	Upton Grain Co.——Upten Grain Co.
39.	Hudson Bros.——Hudson Bros.	89.	E. E. Atkinson——E. E. Atkinson
40.	D. M. Ferry & Co.——D. M. Ferry Co.	90.	Zeisler Furrier——Ziesler Furrier
41.	Johnsen A. J.——Johnson A. J.	91.	E. G. Kenyon——E. G. Kenyon
42.	Todd & Son——Todd & Sons	92.	Backus, Roy——Backus, Ray
43.	Merrill Palmer——Merrill Palmer	93.	Carpenter Steel Co.——Carpenter Steel Co.
44.	T. Cook & Son——T. Cook & Son	94.	W. E. Davenport——W. E. Davanport
45.	Funk & Wagnall——Funk & Wagnull	95.	John Kingsley——John G. Kingsley
46.	F. H. Vizetelly——F. H. Vizitelly	96.	Lane Inc.——Lane Inc.
47.	Higgen & Co.——Higgin & Co.	97.	T. G. Lentingworth——T. G. Lentinworth
48.	Bert Cooksley——Bert Cooksley	98.	Elizabeth Bennett——Elizabeth Bennett
49.	W. C. Wadsworth Co.——W. C. Wadworth Co.	99.	Charibel——Claribel
50.	Alvah Bushnell——Alvah Bushnell	100.	R. C. A. Victor Company——R. C. A. Victer Company

B d

√ Check if the two names are the same.

101. Crane Ltd.———Crane Co.
102. Isaac F. Marcosson———Isaac F. Marcoson
103. Stromberg Carlson———Stromberg Carlsen
104. W. A. Evans———W. A. Evans
105. Mason Tile Co.———Matson Tile Co.
106. Clark Frame Co.———Clark Frame Co.
107. William G. Kellogg———William P. Kellogg
108. Berwind Briquets———Berwind Briquets
109. F. W. Bronson———F. W. Bronson
110. Nash Motors———Nash Motor

111. C. E. Locke———C. E. Lock
112. Mazer Cressman Co.———Mazer Cressmon Co.
113. Leslie Thrasher———Leslie Thrasher
114. Plough Inc.———Plough Lt'd.
115. Walpole———Wallpole
116. John Hergesheim———John Hergesheimer
117. Hudson Bay & Co. Ltd.———Hudson Bay Co. Ltd.
118. Lassco Co.———Lassko Co.
119. Albert Mills———Albert Mill
120. Yale Stores———Yale Store

121. Bob Fairbanks———Bob Fairbanks
122. Denton Products———Denten Products
123. Wells Dickey Co.———Wells Dickey Inc.
124. S. N. Jonas———S. N. Jonus
125. Warren Co.———Warren Co.
126. Kelly Transfer———Kelly Transfer
127. S. Karpen & Brothers———S. Karpen & Brothers
128. A. J. Drexel———A. J. Drexel
129. C. H. Salmon———S. H. Salmon
130. H. Simons Lbr. Co.———H. Simons Lbr. Co.

131. Villaume Lbr. Co.———Villaum Lbr. Co.
132. Banett Company———Banett Company
133. B. B. Quinn———B. B. Quinn
134. Beauville Co.———Beauxville Co.
135. Gordon Mfg. Co.———Gordon Mfg. Co.
136. Curtis Mill Co.———Curtis Mill Co.
137. S. Jacobs & Company———S. Jacobs & Company
138. W. Morton———W. Morten
139. F. D. Prescott———F. D. Prescott
140. Old Gold———Old Gold

141. Jones Inc.———Jones Bros.
142. Petropalm & Son Inc.———Petropalm & Son Inc.
143. Palmers Ltd.———Palmers Ltd.
144. Higgin Mfg. Co.———Higgen Mfg. Co.
145. Lehigh Coal Sales———Lehigh Coal Sales
146. Buick Motor Co.———Buick Motors Co.
147. George Carpenter———George Carpentier
148. H. H. Hemenway———H. H. Hememway
149. M. A. Gladding———M. A. Gladding
150. F. J. Cheney & Co.———F. J. Cheney & Co.

151. H. J. Heinz———H. J. Hienz
152. National City Co.———National City Co.
153. Dorothy Gray———Dorothy Gray
154. Reinhard Brothers———Reinhart Brothers
155. Oscar Bye———Oscar Bye
156. Ben Coal Co.———Ben Coal Co.
157. C. Lundstrom Mfg. Co.———C. Lundstrom Mfg. Co.
158. J. C. McKesson Drug Co.———J. C. MacKesson Drug Co.
159. Waite Coal Co.———Wait Coal Co.
160. Berry Brothers———Berry Brothers

161. J. Coty Co.———J. Coty Co.
162. F. R. Connell———F. R. Connell
163. Dr. Miles Company———Dr. Mills Company
164. Northam Warrer———Northam Warren
165. Indian Refining Co.———Indian Refining Co.
166. Jack Richard———Jack Richard
167. Kirsch Mfg. Co.———Kircsh Mfg. Co.
168. Jack Wachter———Jack Wachter
169. C. M. Stend———C. M. Stent
170. John Blassingham———John Blassingham

171. W. W. Brock———W. W. Brock
172. L. Waterman Company———L. Watermon Company
173. F. H. Weaver———F. P. Weaver
174. Multistamp Co., Inc.———Multistamp Co., Inc.
175. Sani-flush———Sani-flush
176. Tung Sol Lamp Inc.———Tung Sul Lamp Inc.
177. F. J. Suderman———F. J. Suderman
178. Theo. Audel & Co.———Theo. Audel Co.
179. Cox Realtors———Cox Realtors
180. Kellogg Company———Kellogg Company

181. Ann Lowe———Anna Lowe
182. A. Cederstrand & Son———A. Cedarstrand & Son
183. Marschke Co.———Marsckhe Co.
184. Collum & Ackerman———Collum & Ackerman
185. Insulite Co.———Insulite Co.
186. General Steel Co.———General Steel Co.
187. Charles Von Buelow———Charles Von Beulow
188. A. D. Beaudette———A. D. Beaudette
189. Firestone Tire Co.———Firestone Tire Co.
190. Foxsworth & Son———Foxsworth & Son

191. A. S. Hinds Co.———A. S. Hinds Co.
192. Charles Beardslee———Charles Beardslee
193. Axton Tobacco Co.———Axeton Tobacco Co.
194. Inso Board Co.———Inso Board Co.
195. Stanley Russell———Stanley Russell
196. Babson Mfg. Co.———Babsen Mfg. Co.
197. Bodee Institute———Bodee Institute
198. Greer College———Greer College
199. Lampland Lbr. Co.———Lamplund Lbr. Co.
200. Bird & Son Inc.———Bird & Sons Inc.

AMERICAN COUNCIL ON EDUCATION

COOPERATIVE ENGLISH TEST

TEST C1: READING COMPREHENSION

(Lower Level)

FORM Q

B e

by

FREDERICK B. DAVIS, Cooperative Test Service

and

F. S. BEERS, University of Georgia; WARNER F. GOOKIN, Avon Old Farms;
D. G. PATERSON, University of Minnesota; and MARY WILLIS, Cooperative Test Service

with the cooperation of

WALTER F. DEARBORN, Harvard University; DONALD D. DURRELL, Boston University; DANIEL D. FEDER, University of Illinois;
WILLIAM S. GRAY, University of Chicago; ARTHUR E. TRAXLER, Educational Records Bureau;
and LOUIS C. ZAHNER, Groton School

Please print:

Name..... Date.....
Last First Middle

Grade or Class..... Age..... Date of Birth.....
Yrs. Mos.

School..... City..... Sex.....
M. or F.

Title of the English course you are now taking..... Instructor.....

General Directions: Do not turn this page until the examiner tells you to do so. This examination consists of two parts, and requires 40 minutes of working time. The directions for each part are printed at the beginning of the part. Read them carefully and proceed at once to answer the questions. DO NOT SPEND TOO MUCH TIME ON ANY ONE ITEM. ANSWER THE EASIER QUESTIONS FIRST; then return to the harder ones if you have time. There is a time limit for each part. If you finish Part I before the time is up, go on to Part II. If you have not finished Part I when the time is up, stop work on that part and proceed at once to Part II. If you finish Part II before time is up, you may go back and work on either part. No questions may be asked after the examination has begun.

You may answer questions even when you are not perfectly sure that your answers are correct, but you should avoid **wild** guessing, since wrong answers will result in a subtraction from the number of your correct answers.

Part	Minutes
I. Vocabulary	15
II. Reading	25
Total	40

	Scaled Score	Percentile
Vocabulary		
Speed of Comprehension		
Level of Comprehension		

(Sum of Scaled Scores for Parts:)

Total		

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15 Amsterdam Avenue, New York City

PART I: VOCABULARY (15 minutes)

Directions: In each group below, select the numbered word or phrase which **most nearly** corresponds in meaning to the word at the head of that group, and put its **number** in the parentheses at the right. It is quite likely that you will finish this part before the time is up. In that case, **go on immediately to Part II.**

1. **adverb**
   1–1 part of speech
   1–2 reaction
   1–3 grammatical rule
   1–4 criticism
   1–5 insult . . . . . 1( )

2. **antelope**
   2–1 fruit
   2–2 animal
   2–3 prelude
   2–4 feeler
   2–5 gallop . . . . . 2( )

3. **spaniel**
   type of
   3–1 sword
   3–2 dog
   3–3 lace
   3–4 horse
   3–5 coin . . . . . 3( )

4. **cello**
   4–1 musical instrument
   4–2 gelatin
   4–3 foot lever
   4–4 game
   4–5 boat . . . . . 4( )

5. **carnival**
   5–1 slaughter
   5–2 banquet
   5–3 funeral
   5–4 sensual
   5–5 festival . . . . 5( )

6. **fussy**
   6–1 stupid
   6–2 particular
   6–3 reserved
   6–4 curious
   6–5 interested . . . 6( )

7. **booklet**
   7–1 pamphlet
   7–2 folio
   7–3 binding
   7–4 library
   7–5 chapter . . . . 7( )

8. **sodium**
   8–1 cement
   8–2 platform
   8–3 club
   8–4 chemical
   8–5 star . . . . . 8( )

9. **reinforcement**
   9–1 rearranging
   9–2 development
   9–3 suggestion
   9–4 strengthening
   9–5 reminder . . . 9( )

10. **slop**
    10–1 forget
    10–2 steal
    10–3 spill
    10–4 clean
    10–5 eat . . . . . 10( )

11. **chieftain**
    11–1 headdress
    11–2 importance
    11–3 leader
    11–4 sacrifice
    11–5 tribe . . . . 11( )

12. **bonfire**
    12–1 fireworks
    12–2 conflagration
    12–3 glowing embers
    12–4 outdoor fire
    12–5 hearth fire . . 12( )

13. **awning**
    13–1 canopy
    13–2 trellis
    13–3 utensil
    13–4 pit
    13–5 carpet . . . . 13( )

14. **container**
    14–1 fee
    14–2 clutch
    14–3 impurity
    14–4 receptacle
    14–5 wall . . . . . 14( )

15. **radium**
    15–1 heat
    15–2 distance across
    15–3 electron
    15–4 chemical element
    15–5 transmitter . 15( )

16. **arena**
    16–1 contest
    16–2 insect
    16–3 wilderness
    16–4 crown
    16–5 amphitheater 16( )

17. **underworld**
    17–1 criminal classes
    17–2 uneducated classes
    17–3 revolutionists
    17–4 poorer classes
    17–5 riffraff . . . 17( )

18. **cavalryman**
    18–1 minister
    18–2 gravedigger
    18–3 adventurer
    18–4 undertaker
    18–5 mounted soldier . . . 18( )

19. **changeable**
    19–1 intermittent
    19–2 fretful
    19–3 variable
    19–4 faithless
    19–5 confused . . 19( )

20. **assassination**
    20–1 warfare
    20–2 worship
    20–3 murder
    20–4 disaster
    20–5 execution . . 20( )

21. **accumulation**
    21–1 battery
    21–2 collection
    21–3 population
    21–4 investigation
    21–5 evidence . . . 21( )

22. **mobilize**
    22–1 assemble
    22–2 transport
    22–3 modernize
    22–4 scatter
    22–5 standardize . 22( )

23. **turquoise**
    23–1 drink
    23–2 spangle
    23–3 candy
    23–4 cloth
    23–5 gem . . . . 23( )

24. **simpleton**
    24–1 dunce
    24–2 youth
    24–3 dabbler
    24–4 quack
    24–5 plebeian . . . 24( )

25. **alternation**
    25–1 quarreling
    25–2 taking turns
    25–3 giving up hope
    25–4 making certain
    25–5 trembling . . 25( )

26. **callous**
    26–1 hardened
    26–2 difficult
    26–3 noisy
    26–4 sensitive
    26–5 wicked . . . 26( )

27. **absorbing**
    27–1 wet
    27–2 forgiving
    27–3 liking
    27–4 engrossing
    27–5 shocking . . 27( )

28. **confectionery**
    28–1 candy store
    28–2 sugar refinery
    28–3 bits of paper
    28–4 liking
    28–5 imagination . 28( )

29. **bash**
    29–1 retire
    29–2 smash
    29–3 resist
    29–4 punish
    29–5 defend . . . 29( )

30. **churl**
    30–1 knothole
    30–2 peasant
    30–3 pattern
    30–4 sour milk
    30–5 tub . . . . . 30( )

Go on to the next page.

31. barracks
31–1 underground passages
31–2 wharves
31–3 boats
31–4 living quarters
31–5 city walls . . 31( )

32. sheen
32–1 spite
32–2 luster
32–3 organ
32–4 turf
32–5 plumage . . . 32( )

33. albatross
33–1 debris
33–2 bird
33–3 plant
33–4 dungeon
33–5 official . . . 33( )

34. atone
34–1 chant
34–2 make up for
34–3 reward
34–4 sing off key
34–5 sacrifice . . . 34( )

35. accentuate
35–1 conceal
35–2 locate
35–3 emphasize
35–4 yield
35–5 signify . . . 35( )

36. affable
36–1 comfortable
36–2 frightened
36–3 wealthy
36–4 fertile
36–5 sociable . . . 36( )

37. swirl
37–1 eddy
37–2 flight
37–3 braid
37–4 sweat
37–5 dent . . . . 37( )

38. cleaver
38–1 lathe
38–2 healer
38–3 chopper
38–4 fulcrum
38–5 prow . . . . 38( )

39. compatriot
39–1 fellow countryman
39–2 partisan
39–3 demagogue
39–4 fellow conspirator
39–5 traitor . . . 39( )

40. topaz
40–1 mosaic
40–2 mineral
40–3 crest
40–4 wig
40–5 veil . . . . . 40( )

41. preamble
41–1 foresight
41–2 precaution
41–3 forerunner
41–4 preview
41–5 preface . . . 41( )

42. ashen
42–1 trembling
42–2 old
42–3 dirty
42–4 stupid
42–5 pale . . . . 42( )

43. stampede
43–1 quarrel
43–2 flight
43–3 herd
43–4 weevil
43–5 starfish . . . 43( )

44. chameleon
44–1 tunic
44–2 lizard
44–3 rainbow
44–4 goat
44–5 snake . . . . 44( )

45. countrified
45–1 patriotic
45–2 naturalized
45–3 rural
45–4 landscaped
45–5 healthy . . . 45( )

46. tense
46–1 thick
46–2 close
46–3 steady
46–4 tight
46–5 dramatic . . 46( )

47. cartilage
47–1 tissue
47–2 bullet
47–3 transportation
47–4 waste
47–5 fodder . . . 47( )

48. posterior
48–1 twilight
48–2 postponement
48–3 advance
48–4 sign
48–5 back . . . . 48( )

49. conscript
49–1 inscribe
49–2 compose
49–3 copy
49–4 draft
49–5 steal . . . . 49( )

50. buffoon
50–1 soldier
50–2 brush
50–3 clown
50–4 bluffer
50–5 horn . . . . 50( )

51. baste
51–1 rebuke
51–2 build
51–3 scour
51–4 slide
51–5 moisten . . . 51( )

52. elite
52–1 intellectual
52–2 sophisticated
52–3 socially superior
52–4 wealthy
52–5 graceful . . . 52( )

53. guffaw
53–1 sneeze
53–2 grumble
53–3 shriek
53–4 cough
53–5 laugh . . . . 53( )

54. bumper
54–1 buffer
54–2 surplus
54–3 lever
54–4 collision
54–5 manifold . . 54( )

55. asylum
55–1 trick
55–2 not symmetrical
55–3 refuge
55–4 prison
55–5 not usual . . 55( )

56. thews
56–1 feet
56–2 savages
56–3 birds
56–4 muscles
56–5 hedges . . . 56( )

57. hindrance
57–1 burden
57–2 help
57–3 impediment
57–4 back country
57–5 compliment . 57( )

58. potency
58–1 danger
58–2 emphasis
58–3 strength
58–4 attraction
58–5 tendency . . 58( )

59. consternation
59–1 repulsion
59–2 indignation
59–3 impatience
59–4 dismay
59–5 collapse . . . 59( )

60. pedantic
60–1 displaying anger
60–2 having feet
60–3 foppish
60–4 conservative
60–5 showing off learning . . . 60( )

Go on to the next part.

Number wrong	0–2	3–6	7–10	11–14	15–18	19–22	23–26	27–30	31–34	35–38	39–42	43–46	47+
Amount to be subtracted	0	1	2	3	4	5	6	7	8	9	10	11	12

Number right_____

Subtract _____
(See table above)

Raw Score = Difference _____

Scaled Score _____
(See table on key)

PART II

READING

(25 minutes)

Directions: This part consists of selections taken from stories, articles, textbooks, etc. Following each passage are several multiple-choice items concerning the selection. In each case you are to **read the selection carefully first,** and then decide on the basis of the selection which one of the choices given after each incomplete statement **best** completes the meaning of the statement. If you cannot decide, you may go back to the passage. Put the **number** of your choice in the parentheses at the right of each item. You are not expected to finish this part in the time allowed, but work as rapidly as you can without making careless mistakes.

Mr. Harmsworth hands me a note giving the firm name and address in Wall Street. An assignment! I am to report! I dart out of the office into the elevator, and asking anybody for directions, find my way to Wall Street—Wall Street!—and the office of the missing broker. His partner rebuffs me. "No, I don't know why he skipped. No, nothing missing. How should there be?" But I am not going to fail on my first chance; so I persist, asking questions, all about the missing man, and when that causes irritation, all about Wall Street. The broker soon is talking; we move into his private office, and I tell him the story of my life. He tells me his. Just as I become convinced that the missing broker is innocent of anything more than a spree and am turning over in my mind the best way to write the story up, the broker springs up all of a sudden and says . . .

1. The writer hopes to become a
   - 1–1 financier.
   - 1–2 detective.
   - 1–3 journalist.
   - 1–4 bond salesman.
   - 1–5 broker. . . . . .1( )

2. The writer's attitude toward his job is
   - 2–1 bored.
   - 2–2 disgusted.
   - 2–3 resigned.
   - 2–4 matter-of-fact.
   - 2–5 enthusiastic. . . . . .2( )

3. The writer
   - 3–1 evidently had grown up in New York.
   - 3–2 was surprised to find himself lost in familiar territory.
   - 3–3 evidently had great difficulty finding the office.
   - 3–4 felt hesitant about asking his way around.
   - 3–5 was unfamiliar with New York. .3( )

4. In the quotation which follows this passage, the partner probably
   - 4–1 tells the writer to get out.
   - 4–2 offers the writer a job.
   - 4–3 gives the writer an inside tip on the stock market.
   - 4–4 admits that the missing broker has gone off with their funds.
   - 4–5 says that the missing funds are safe in the bank. . . . . .4( )

– – – – – – – – –

The female cicada is often confused with the grasshopper, which is really a locust. She lays her eggs in a cavity made by slitting the twigs or small fruits of trees with her sawlike ovipositor. Tiny nymphs hatch in five to eight weeks and bury themselves in the ground where they remain for seventeen years, sucking juices from the roots of trees. Then they crawl out and up the trunks of trees where their skins burst open and they appear as adult cicadas. Their enemies are certain other insects, such as the digger wasp, sometimes called the mining digger wasp, the hornet, and the dragonfly. The digger wasp merely paralyzes its prey in order to assure itself of living food.

5. The nymphs live in
   - 5–1 twigs.
   - 5–2 the trunks of trees.
   - 5–3 fruit.
   - 5–4 the ground.
   - 5–5 roots. . . . . .5( )

6. According to the passage, the cicada is attacked by
   - 6–1 locusts.
   - 6–2 nymphs.
   - 6–3 grasshoppers.
   - 6–4 caterpillars.
   - 6–5 digger wasps. . . . . .6( )

7. The cicada is often incorrectly called a
   - 7–1 wasp.
   - 7–2 hornet.
   - 7–3 locust.
   - 7–4 nymph.
   - 7–5 dragonfly. . . . . .7( )

8. The best title for this paragraph is
   - 8–1 "Insect Life."
   - 8–2 "The Cicada."
   - 8–3 "The Cicada's Enemies."
   - 8–4 "The Cicada's Home."
   - 8–5 "The Digger Wasp's Food." . .8( )

– – – – – – – – –

(1) "Sink or swim, live or die, survive or perish,
(2) I give my hand and my heart to this vote. It
(3) is true, indeed, that in the beginning we aimed
(4) not at independence. But there's a Divinity
(5) which shapes our ends. The injustice of Eng-
(6) land has driven us to arms; and, blinded to her
(7) own interest in our good, she has obstinately
(8) persisted, till independence is within our grasp."

Go on to the next page.

9. The vote referred to in line 2 must be about
   9–1 declaring war.
   9–2 making peace.
   9–3 declaring independence.
   9–4 sending a petition to England.
   9–5 asking Divine guidance. . . . . 9( )

10. The reader concludes that the speaker
   10–1 has made up his mind.
   10–2 is undecided on the issue.
   10–3 is ready to forgive and forget.
   10–4 is afraid to face consequences.
   10–5 is willing to compromise. . . . 10( )

11. The tone of the passage is
   11–1 emotional.
   11–2 restrained.
   11–3 matter-of-fact.
   11–4 sarcastic.
   11–5 insincere. . . . . 11( )

- - - - - - - - -

Chemistry is a most effective agent for democracy, since it actually accomplishes in regard to many material things that equality which legislation aims to bring about in the political sphere. Luxuries, formerly the monopoly of the privileged classes, become through applied science the common property of the masses. The "royal purple" of the ancients and dyes far more beautiful are now to be had on the bargain counter, and Solomon in all his glory was not arrayed like the modern American maiden. Even though her purse be scant, she need not lack jewels and bright raiment such as once were worth a slave's life. Fruits exotic and out of season are upon our dinner table, and the china we eat them from is not from China but made from a clay bank at home. In early ages the man who owned a piece of steel shaped it into a sword and made himself master of his fellows. Now we make buildings out of steel, and he who lives in the garret of one of them could look down on the Tower of Babel. The Feudal Age vanished at the first whiff of gunpowder, for that device of the Black Art leveled the natural and artificial inequalities of humanity in warfare, since with a gun in his hand the churl could meet the knight on equal footing, and the dwarf was a match for the giant—more than a match, for the dwarf had a larger target.

12. The writer's main point is that chemistry
   12–1 has made dwarfs superior to giants.
   12–2 has brought the rich down to the level of the poor.
   12–3 has narrowed the gap between rich and poor.
   12–4 brought feudalism to an end.
   12–5 has increased the number of luxuries. . . . . 12( )

13. The writer's purpose is to
   13–1 glorify modern chemistry.
   13–2 make the world more democratic.
   13–3 condemn the luxury of the modern world.
   13–4 demonstrate the backwardness of the ancient world.
   13–5 compare the modern and ancient worlds. . . . . 13( )

B e

14. We may conclude that all chinaware was once imported from China because the writer states that it
   14–1 came from China originally.
   14–2 is a fit receptacle for exotic fruits.
   14–3 was named for the place it was made in.
   14–4 does not come from China today.
   14–5 is made from clay banks at home. . . . . 14( )

15. The writer appears to believe that the everyday achievements of our time
   15–1 nearly equal the wonders of the ancient world.
   15–2 would have been superfluous in the ancient world.
   15–3 pervert the achievements of the ancient world.
   15–4 exceed the wonders of the ancient world.
   15–5 have their origin in the wonders of the ancient world. . . . . 15( )

16. One of the points made in this passage is that present-day chinaware is
   16–1 not genuine.
   16–2 made of poor materials.
   16–3 no longer the strange product of a far land.
   16–4 as exotic as fruits out of season.
   16–5 superior to the Chinese product. 16( )

17. In warfare before the appearance of gunpowder, the
   17–1 churl was not a match for the knight.
   17–2 knight could not fight on foot.
   17–3 knight and churl never met.
   17–4 churl had too great an advantage over the knight.
   17–5 churl was equal to the knight. 17( )

18. The passage points out that the clothing of the modern American girl is
   18–1 different from Solomon's.
   18–2 cheaper than Solomon's.
   18–3 as beautiful as Solomon's.
   18–4 inferior to Solomon's.
   18–5 superior to Solomon's. . . . . 18( )

- - - - - - - - -

Go on to the next page.

(1) The continuation of the civil war may be
(2) regarded as infinitely advantageous to France
(3) and Spain, inasmuch as it will exhaust the
(4) victors and the vanquished; but, on the other
(5) hand, there is room to fear, first, that the
(6) English ministry, feeling the insufficiency of
(7) its means, may stretch out the hand of conciliation;
(8) or, secondly, after conquering English
(9) America, may use it as an instrument to sub-
(10) due European England; or, thirdly, beaten on
(11) the continent of America, may seek indemnity
(12) at the expense of France and Spain; or,
(13) fourthly, that the colonists, on attaining inde-
(14) pendence, may, by forcing their surplus pro-
(15) duce upon Spanish America, destroy the ties
(16) which bind our colonies to their metropolis.

19. France and Spain will benefit most if
- 19–1 England wins.
- 19–2 the colonists win.
- 19–3 a truce is declared.
- 19–4 the war continues indefinitely.
- 19–5 the colonies become independent. . . . . .19( )

20. Regarding the outcome of the war, the writer is
- 20–1 sure of English victory.
- 20–2 sure of colonial victory.
- 20–3 uncertain.
- 20–4 not interested.
- 20–5 downhearted. . . . . .20( )

21. "Their metropolis" in line 16 refers to a
- 21–1 city.
- 21–2 province.
- 21–3 colony.
- 21–4 region.
- 21–5 country. . . . . .21( )

22. The Spanish fear the colonists' future
- 22–1 territorial expansion.
- 22–2 form of government.
- 22–3 commercial activities.
- 22–4 national unity.
- 22–5 effect on Europe. . . . . .22( )

– – – – – – – – –

Students are allowed to change courses for which they have registered, up to and including the second Saturday of the Winter or Spring Session. Students carrying full-time programs, however, are expected to complete all changes not later than the second Tuesday of the Winter Session, and the second Wednesday of the Spring Session. All changes must be recorded on blanks furnished by the Registrar and filed with him after they have been approved by the student's adviser, or in the case of students planning their programs for the degrees of Doctor of Education and Doctor of Philosophy, by the adviser and the Director of the School of Education.

23. Changes in programs must be filed with the
- 23–1 Registrar of the School.
- 23–2 student's adviser.
- 23–3 Director of the School of Education.
- 23–4 student's adviser and the Registrar.
- 23–5 student's adviser and the Director of the School of Education. . . . . .23( )

24. Part-time students may change courses in the Winter Session not later than the
- 24–1 first Saturday.
- 24–2 second Saturday.
- 24–3 second Tuesday.
- 24–4 second Wednesday.
- 24–5 first Tuesday. . . . . .24( )

25. At the opening of the Spring Session, full-time students are expected to complete all changes in program by the
- 25–1 second Tuesday.
- 25–2 second Saturday.
- 25–3 third Wednesday.
- 25–4 second Wednesday.
- 25–5 first Tuesday. . . . . .25( )

26. The best heading for this passage would be
- 26–1 Rules for Registration.
- 26–2 Changing Courses.
- 26–3 Permissible Changes in Courses.
- 26–4 Regulations for Changing Registration.
- 26–5 Changing Registrations. . . .26( )

– – – – – – – – –

"God grant that you are right," sighed M. Lerond. "But I dare not allow myself to hope. My profession as a man of law brings me into contact with the vulgar masses, and I invariably find them indifferent, and even hostile to religion. Let me tell you, M. l'Abbé, that my experience of the world leads me to share in the deep sorrow of M. Lantaigne, and not in your optimistic view of things. Now, without going further afield, do you not see that this Christian land of Brecé has become the fief of the atheist and freemason, Dr. Cotard?"

27. To justify his belief, M. Lerond cites
- 27–1 the view of M. l'Abbé.
- 27–2 the view of M. Lantaigne.
- 27–3 his contact with the common people.
- 27–4 his sympathy toward religion.
- 27–5 the Christian land of Brecé. . .27( )

28. M. l'Abbé feels that
- 28–1 men are hostile to religion.
- 28–2 piety is widespread.
- 28–3 Brecé has become a fief.
- 28–4 M. Lantaigne is right.
- 28–5 the masses are indifferent. . . .28( )

29. The speaker regards himself as
- 29–1 pessimistic.
- 29–2 optimistic.
- 29–3 hopeful.
- 29–4 irreligious.
- 29–5 indifferent. . . . . .29( )

30. M. Lerond seems to be
- 30–1 democratic.
- 30–2 aristocratic.
- 30–3 humble.
- 30–4 sympathetic.
- 30–5 tolerant. . . . . .30( )

* * * * *

Go on to the next page.

An instrument used for measuring altitude and very similar to a cross-staff is the quadrant. This is the quarter part of a circle, 90°, and thereby gets its name. To make a crude quadrant, the following directions must be followed carefully. Fixing the center point near one corner, use the compass to draw a quarter circle with a radius of 6 inches on an 8 × 8 inch wood block. With a protractor, divide the quarter circle into 5° divisions and draw the 19 lines from the center point to the circle line. Label each line with the correct angle from 0° to 90°. Then, attaching eyelets to the edge of the wood block, fasten the quadrant board to a support, using a wing nut, a bolt, and two metal washers. The wood block should be loose enough to pivot on the bolt at the center point.

31. The length of the lines drawn to the center point is
- 31–1 12 inches.
- 31–2 10 inches.
- 31–3 8 inches.
- 31–4 6 inches.
- 31–5 5 inches. . . . . .31( )

32. A quadrant is used to
- 32–1 draw lines to the circle line.
- 32–2 determine height.
- 32–3 divide a circle into divisions.
- 32–4 make a cross-staff.
- 32–5 find the quarter part of a circle. 32( )

33. After drawing a quarter circle, the next step is to
- 33–1 draw the 19 lines to the circle.
- 33–2 label each line with the correct angle.
- 33–3 use the compass.
- 33–4 lay off six inches on the wood block.
- 33–5 make the divisions in the quarter circle. . . . . .33( )

34. The first line is labeled 0°. The sixth line should, therefore, be labeled
- 34–1 90 degrees.
- 34–2 50 degrees.
- 34–3 30 degrees.
- 34–4 25 degrees.
- 34–5 18 degrees. . . . . .34( )

– – – – – – – – –

One chief cause of the badness of the roads seems to have been the defective state of the law. Every parish was bound to repair the highways which passed through it. The peasantry were forced to give their labor without pay for six days in the year. If this was not sufficient, hired labor was employed, and the expense was met by a parish tax. That a route connecting two great towns, which have a large and thriving trade with each other, should be maintained at the cost of the rural population scattered between them is obviously unjust; and this injustice was especially great in the case of the Great North Road, which traversed very poor and thinly inhabited districts, but joined very rich and populous districts. Indeed it was not in the power of the parishes of Huntingdonshire to mend a highway worn by the constant traffic between Yorkshire and London.

35. The peasants were compelled to
- 35–1 keep the roads in good condition.
- 35–2 work without pay whenever the roads needed repair.
- 35–3 work on the roads without pay for six days a year.
- 35–4 hire men to work on the roads.
- 35–5 use the Great North Road for purposes of trade. . . . . .35( )

B e

36. As a striking example of the effects of this law, the passage specifies the road through the parishes of
- 36–1 the great towns.
- 36–2 England.
- 36–3 London.
- 36–4 Yorkshire.
- 36–5 Huntingdonshire. . . . . .36( )

37. Hired laborers were employed whenever
- 37–1 the peasants refused to work.
- 37–2 the parish could afford it.
- 37–3 the roads were in disrepair.
- 37–4 forced labor proved inefficient.
- 37–5 forced labor proved insufficient. 37( )

38. The writer makes clear that, in his opinion, the law was
- 38–1 unpopular.
- 38–2 wasteful.
- 38–3 necessary.
- 38–4 effective.
- 38–5 unfair. . . . . .38( )

39. Road repairs were made at the expense of
- 39–1 trading companies who used the roads.
- 39–2 the cities of London and York.
- 39–3 the great towns.
- 39–4 travelers.
- 39–5 parishes through which the roads passed. . . . . .39( )

40. The main thought of this passage is that
- 40–1 there was very heavy traffic between Yorkshire and London.
- 40–2 the repair of roads was enforced by law.
- 40–3 the roads should have been maintained at the expense of London.
- 40–4 the laws for the upkeep of roads were inadequate.
- 40–5 the country districts were thinly populated. . . . . .40( )

41. The passage implies that the roads conferred the most benefit on the
- 41–1 large cities they connected.
- 41–2 peasants they put to work.
- 41–3 rural districts.
- 41–4 shire of Huntingdon.
- 41–5 transportation industry. . . .41( )

– – – – – – – – –

Go on to the next page.

Charles Bennett was at the woodpile. He still wore the coat of the broadcloth suit that he had been married in, that he now wore as badge of his gentility when he went to church, or off trading. Bob saw his father's hands, big for the rest of him, close around a bundle of wood. He was doing Bob's work, and in his good coat. Bob ran to him.

"I'll git it, Pa."

He hoped his willingness, now, would cover his delinquency. His father straightened his back.

"I near about give you out, son," he said.

"I went to the glen."

"Hit were a mighty purty day to go," Charles said. "Or to go anywhere. How come you to take out such a fur piece?"

42. Charles Bennett was probably
- 42–1 poor.
- 42–2 odd.
- 42–3 lazy.
- 42–4 selfish.
- 42–5 unhappy. . . . . 42( )

43. Bob felt
- 43–1 happy.
- 43–2 guilty.
- 43–3 disappointed.
- 43–4 lucky.
- 43–5 comfortable. . . . . 43( )

44. Charles must have been
- 44–1 doing his regular chores.
- 44–2 surprised to see Bob.
- 44–3 expecting Bob for some time.
- 44–4 startled by Bob's offer of help.
- 44–5 disappointed to see Bob. . . . 44( )

45. We may infer that Charles had most likely been
- 45–1 hunting.
- 45–2 fishing.
- 45–3 hoeing.
- 45–4 trading.
- 45–5 trapping. . . . . 45( )

46. Charles seems to have been
- 46–1 angry with Bob.
- 46–2 an understanding father.
- 46–3 a strict disciplinarian.
- 46–4 an indifferent man.
- 46–5 unconcerned about Bob. . . . 46( )

47. By "take out such a fur piece" Charles meant
- 47–1 wear that kind of fur clothing.
- 47–2 catch that sort of fur-bearing animal.
- 47–3 go so long a way.
- 47–4 bring such an evergreen bough.
- 47–5 go for a walk. . . . . 47( )

– – – – – – – – –

(1) Light, in the latest theory, is not waves in a
(2) sea of ether, or a jet from a nozzle; it could be
(3) compared rather to machine-gun fire, every
(4) photoelectric bullet of energy traveling in
(5) regular rhythm, at a speed that bridges the as-
(6) tronomical gap in eight minutes. As each
(7) bullet hits an electron of chlorophyll it sets it
(8) to vibrating, at its own rate, just as one tuning
(9) fork, when struck, will cause another to hum
(10) in the same pitch. A bullet strikes—and one
(11) electron is knocked galley-west into a dervish
(12) dance like the madness of the atoms in the
(13) sun. The energy splits open the chlorophyll
(14) molecules, recombines their atoms, and lies
(15) there, dormant, in foods.

48. If light is like machine-gun fire, what takes the place of the machine gun?
- 48–1 A molecule
- 48–2 A nozzle
- 48–3 The astronomical gap
- 48–4 The chlorophyll
- 48–5 The sun . . . . . 48( )

49. The astronomical gap referred to in lines 5 and 6 is between
- 49–1 the earth and the sun.
- 49–2 the bullet and the electrons.
- 49–3 the moon and the sun.
- 49–4 the earth and the moon.
- 49–5 the sun and the nearest star. . 49( )

50. According to the paragraph, light causes vibrations in
- 50–1 chlorophyll.
- 50–2 tuning forks.
- 50–3 foods.
- 50–4 the ether.
- 50–5 rhythm. . . . . 50( )

51. The explanation presented in the paragraph is
- 51–1 empirical.
- 51–2 unscientific.
- 51–3 fantastic.
- 51–4 ancient.
- 51–5 theoretical. . . . . 51( )

– – – – – – – – –

(1) I was no sooner come into Gray's Inn Walks,
(2) but I heard my friend, Sir James, upon the
(3) terrace hemming twice or thrice to himself
(4) with great energy, for he loves to clear his
(5) pipes in good air—to make use of his own
(6) phrase—and is not a little pleased with any-
(7) one who takes notice of the strength which he
(8) still exerts in his morning hems.
(9) I was touched with a secret joy at the sight
(10) of the good old man, who before he saw me
(11) was engaged in conversation with a beggar-
(12) man that had asked an alms of him. I could
(13) hear my friend chide him for not finding out
(14) some work; but at the same time saw him put
(15) his hand in his pocket and give him sixpence.

Go on to the next page.

52. It is clear that Sir James is
52–1 stern.
52–2 intemperate.
52–3 kindly.
52–4 vain.
52–5 wealthy. . . . . .52( )

53. "Hemming" in line 3 most nearly means
53–1 humming.
53–2 singing.
53–3 talking.
53–4 coughing.
53–5 sewing. . . . . .53( )

54. "In good air" Sir James likes to
54–1 clean his briars.
54–2 exercise vigorously.
54–3 walk around.
54–4 clear his throat.
54–5 tune up his bagpipes. . . . . .54( )

55. Beggars, in Sir James's opinion, are
55–1 lazy.
55–2 incompetent.
55–3 disagreeable.
55–4 offensive.
55–5 criminal. . . . . .55( )

56. Sir James likes to think of himself as
56–1 vigorous.
56–2 generous.
56–3 dignified.
56–4 attracting attention.
56–5 a good musician. . . . . .56( )

– – – – – – – – –

We are a young, a laughter-loving nation. We have no stomach for the heavy tragedies of older, more sophisticated races. Our youthfulness of spirit prompts us still to believe in romance, to seek the idealization of life. Hence, the "boy meets girl" formula. Our *joie de vivre* leads us to develop comedy to a high degree of art. This development is entirely in keeping with our national spirit. Perhaps the whole situation can be reduced to the fact that we don't take our movies seriously because we don't take ourselves seriously. We are not pompous. We are constantly holding up our faults to laughter. In how many other countries do you find so frank and searching self-criticism?

57. The answer which the writer probably expects to the question which ends the paragraph is
57–1 all.
57–2 almost all.
57–3 many.
57–4 a few.
57–5 none. . . . . .57( )

58. The "boy meets girl" formula expresses our
58–1 idealization of life.
58–2 *joie de vivre.*
58–3 sophisticated point of view.
58–4 love of laughter.
58–5 self-criticism. . . . . .58( )

59. According to the passage, American movies
59–1 have a serious tone.
59–2 are artistic. B e
59–3 portray everyday life.
59–4 reflect the American spirit.
59–5 try to improve American taste. 59( )

60. The writer concludes that our national spirit springs chiefly from our
60–1 capacity for self-criticism.
60–2 *joie de vivre.*
60–3 lack of sophistication.
60–4 belief in romance.
60–5 love of simplicity. . . . . .60( )

* * * * *

(1) The modern poilu therefore is a citizen-
(2) soldier. He was born—both man and name—
(3) of the World War of 1914–18. Strictly speak-
(4) ing, he did not appear before 1915, when all
(5) the manhood of France had been mobilized
(6) and the war had become national in the fullest
(7) sense. True, during the Revolution the na-
(8) tion had risen against an invading enemy and
(9) defeated him. But the volunteers of 1791
(10) were more enthusiastic than disciplined, a
(11) brave rabble rather than an army. Since
(12) then, despite the principle of conscription, the
(13) wars of France had been fought primarily by
(14) the regular army. So that in 1914 the French
(15) soldier, still retaining the red trousers and kepi
(16) of Restoration days, was known familiarly as
(17) "pioupiou."

61. The Revolutionary army of France was composed of
61–1 conscripts.
61–2 well-disciplined troops.
61–3 volunteers.
61–4 poilus.
61–5 professional soldiers. . . . . .61( )

62. The modern citizen army of France
62–1 is an outgrowth of the World War.
62–2 resembles the volunteers of 1791.
62–3 is of the type which has fought the wars of France for over a century.
62–4 was familiarly known as the "pioupiou."
62–5 has been developed despite the principle of conscription. . . .62( )

63. "Him" in line 9 refers to the
63–1 "poilu."
63–2 "enemy."
63–3 "manhood of France."
63–4 "nation."
63–5 "citizen-soldier." . . . . .63( )

64. "Kepi" in line 15 probably refers to
64–1 caps.
64–2 customs.
64–3 guns.
64–4 formations.
64–5 tents. . . . . .64( )

– – – – – – – – –

Go on to the next page.

While the planets move in the general direction of west to east on the path of the zodiac, they travel oddly at times. Our near neighbor Venus is sometimes seen in the east an hour or so before sunrise and sometimes in the west about an hour after sunset. Venus is called the Morning Star or the Evening Star. Mars, Jupiter, Saturn, and Uranus go along in a more orderly fashion; they do not jump back and forth as Venus does. However, every so often, they act almost as queerly as Venus. Instead of progressing properly from west to east they begin backtracking, a phenomenon called "retrogression" by astronomers. As you watch Mars in its wandering, notice its deep red color. Observe, also, that Saturn has a yellowish-red tinge and that Jupiter is a silver-white color.

65. The author states that the movement of the planets is generally
65–1 toward the south.
65–2 west to east.
65–3 toward the North Star.
65–4 back and forth.
65–5 east to west. . . . . .65( )

66. The yellowish-red star which is mentioned in the passage is
66–1 Mars.
66–2 Venus.
66–3 Saturn.
66–4 Uranus.
66–5 Jupiter. . . . . .66( )

67. The most irregular of the planets is
67–1 Saturn.
67–2 Jupiter.
67–3 Mars.
67–4 Venus.
67–5 Uranus. . . . . .67( )

68. The retrogression of a star means that it
68–1 follows the zodiac path.
68–2 moves from east to west.
68–3 fades at sunrise.
68–4 moves toward the east.
68–5 shows a distinct color. . . . .68( )

69. The passage implies that, of the planets mentioned, the one which is nearest to the earth is
69–1 Saturn.
69–2 Mars.
69–3 Venus.
69–4 Uranus.
69–5 Jupiter. . . . . .69( )

70. Which one of the stars is sometimes called the Morning Star?
70–1 Uranus
70–2 Mars
70–3 Saturn
70–4 Venus
70–5 Jupiter . . . . . .70( )

"Thou has shown unto thy servant David my father great mercy, according as he walked before thee in truth, and in righteousness, and in uprightness of heart with thee; and thou hast kept for him this great kindness, that thou hast given him a son to sit on his throne, as it is this day. And now, O Lord my God, thou hast made thy servant king instead of David my father: and I am but a little child: I know not how to go out or come in. And thy servant is in the midst of thy people which thou hast chosen, a great people, that cannot be numbered nor counted for multitude. Give therefore thy servant an understanding heart to judge thy people, that I may discern between good and bad: for who is able to judge this thy so great a people?"

71. The speaker faces his duty with a feeling chiefly of
71–1 confidence.
71–2 humility.
71–3 understanding.
71–4 pleasure.
71–5 apprehension. . . . . .71( )

72. The speaker believes that David enjoyed God's favor because David
72–1 slew Goliath.
72–2 was merciful.
72–3 had an understanding heart.
72–4 was a good man.
72–5 had defended God's chosen people. . . . . .72( )

73. The speaker says of the people that God had
73–1 been displeased with them.
73–2 made them his own.
73–3 been merciful to them.
73–4 caused them to increase in number.
73–5 built them a temple. . . . . .73( )

74. The father of the speaker is referred to as a
74–1 servant of God.
74–2 warrior.
74–3 son of God.
74–4 little child.
74–5 judge. . . . . .74( )

75. The speaker asks the Lord for
75–1 courage.
75–2 a son to succeed him.
75–3 mercy.
75–4 glory.
75–5 wisdom. . . . . .75( )

Go on to the next page.

(1) The King, who was not distinguished by his
(2) armor and who fought as a private man under
(3) the standard of Sir Walter Manny, remarked
(4) a French knight called Eustace de Ribaumont
(5) who exerted himself with singular vigor and
(6) bravery, and he was seized with a desire of
(7) trying a single combat with him. He stepped
(8) forth from his troop, and calling out Ribau-
(9) mont by name (for he was known to him), he
(10) began a sharp and dangerous encounter. He
(11) was twice beat to the ground by the valor of
(12) the Frenchman, and he twice recovered him-
(13) self. Blows were redoubled with equal force
(14) on both sides, the victory was undecided, till
(15) Ribaumont finding himself to be left almost
(16) alone, cried out, "Sir Knight, I yield myself
(17) your prisoner," and at the same time delivered
(18) his sword to the King.

76. "Remarked" in line 3 means
- 76–1 called.
- 76–2 noticed.
- 76–3 asserted.
- 76–4 spoke of.
- 76–5 found. . . . . 76( )

77. The encounter of the King and Ribaumont was apparently fought
- 77–1 on horseback.
- 77–2 with clubs.
- 77–3 on foot.
- 77–4 with spears.
- 77–5 with daggers. . . . . 77( )

78. The King was
- 78–1 a poor swordsman.
- 78–2 the leader of his troops in the battle.
- 78–3 a noted warrior.
- 78–4 a mediocre soldier.
- 78–5 not easily identified in the armor he was wearing. . . . . 78( )

79. The encounter of the King and Ribaumont began
- 79–1 in the midst of battle.
- 79–2 during a tournament.
- 79–3 for sport.
- 79–4 when Ribaumont attacked the King.
- 79–5 to satisfy the King's honor. . . 79( )

80. The King won because
- 80–1 he was a better swordsman.
- 80–2 Ribaumont lost his weapons.
- 80–3 the French were beaten back.
- 80–4 his armor was better.
- 80–5 Ribaumont's horse was wounded. . . . . 80( )

81. We may infer that the King was
- 81–1 easily discouraged.
- 81–2 reckless.
- 81–3 leading the army in battle.
- 81–4 rarely in combat.
- 81–5 protected by his followers. . . 81( )

B e

September 3rd (Lord's Day).—Up; and put on my colored suit very fine, and my new periwig, bought a good while since, but durst not wear, because the plague was in Westminster when I bought it; and it is a wonder what will be the fashion after the plague is done, as to periwigs, for nobody will dare to buy any hair, for fear of the infection, that it had been cut off the heads of people dead of the plague. To church, where a sorry dull parson, and so home and most excellent company with Mr. Hill and discourse on music.

82. This passage is apparently taken from
- 82–1 an essay.
- 82–2 a diary.
- 82–3 a novel.
- 82–4 a short story.
- 82–5 a sketch. . . . . 82( )

83. The writer had been afraid to wear the new periwig because
- 83–1 he did not know whether it was still fashionable.
- 83–2 he feared that it was improper in time of plague.
- 83–3 wigs are easily infected.
- 83–4 it had come from the hair of plague-stricken persons.
- 83–5 it was bought in a plague-stricken area. . . . . 83( )

84. The writer may best be described as a
- 84–1 tenderhearted person.
- 84–2 timid person.
- 84–3 music lover.
- 84–4 practical person.
- 84–5 scoffer at religion. . . . . 84( )

85. The tone of this passage is
- 85–1 ironical.
- 85–2 persuasive.
- 85–3 solemn.
- 85–4 emotional.
- 85–5 matter-of-fact. . . . . 85( )

Go on to the next page.

(1) Some Englishmen believed that a rebellion
(2) of Arabs against Turks would enable England,
(3) while fighting Germany, simultaneously to
(4) defeat her ally Turkey. Their knowledge of
(5) the nature and power and country of the
(6) Arabic-speaking peoples made them think that
(7) the issue of such a rebellion would be happy:
(8) and indicated its character and method. So
(9) they allowed it to begin, having obtained
(10) formal assurances of help for it from the British
(11) government.

86. According to the writer, the rebellion was planned by
- 86–1 the British government.
- 86–2 some Englishmen.
- 86–3 the Arabs.
- 86–4 the Germans.
- 86–5 the Allies. . . . . 86( )

87. The character and method of the rebellion were indicated by
- 87–1 the issue at stake.
- 87–2 what the Englishmen knew.
- 87–3 the Arabs.
- 87–4 the Turks.
- 87–5 the help that was assured. . . 87( )

88. Which of the following are said to be allies?
- 88–1 England and Germany
- 88–2 Germany and Turkey
- 88–3 Turkey and England
- 88–4 Arabia and Germany
- 88–5 Arabia and Turkey . . . . . 88( )

89. "Happy" in line 7 means
- 89–1 carefree.
- 89–2 joyful.
- 89–3 cheerful.
- 89–4 agreeable.
- 89–5 prosperous. . . . . 89( )

90. We may infer that the Arabs were ruled by the
- 90–1 Turks.
- 90–2 English.
- 90–3 Germans.
- 90–4 Arab chieftains.
- 90–5 Germans and Turks. . . . . 90( )

* * * * *

Number wrong	0 | 2	3 | 6	7 | 10	11 | 14	15 | 18	19 | 22	23 | 26	27 | 30	31 | 34	35 | 38	39 | 42	43 | 46	47 | 50	51 | 54	55 | 58	59 | 62	63 | 66	67 | 70	71 | +
Amount to be subtracted	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Speed of Comprehension Score

Total number right_____

Subtract_____
(See table above)

Raw Score = Difference_____

Scaled Score_____
(See table on key)

Level of Comprehension Score

Number of *completed* scales_____
(1 if last item marked is 30, 31, ··· 59;
2 if last item marked is 60, 61, ··· 89;
3 if last item marked is 90)

Number right_____
(on *completed* scales only)

Subtract_____
(Look up in table at left amount to be subtracted corresponding to the number wrong on *completed* scales)

Raw Score = Difference_____

Scaled Score_____
(See table on key under column corresponding to number of scales *completed*)

Whitman High School

Bookkeeping Selection Arithmetic Test

B f

1. Add:

$ 473.94	$1,827.38	$756.54	$4,746.35
846.32	8,837.60	653.98	2,746.93
2,847.19	52.95	523.09	.64
347.68	74.93	645.92	.70
4,737.98	3.23	630.84	5.43
18.65	8,837.54	543.32	6.97
9,863.49	634.35	187.65	3,546.72
830.02	7,655.63	543.76	786.49
1,432.85	5,352.63	654.87	78.54
927.63	1.23	234.78	543.92

2. Subtract:

$3,847,234.94	$573,293.60
1,473,876.65	263,978.60

3. Multiply:
$1,964.60 by 6%. Answer_____ $942.00 by 5½%. Answer_____

4. The following decimals are equal to what fractions?
.40 is equal to _____ .375 is equal to _____

5. A equals B plus C

If A is 54 and B is 15, find C. Answer_____
If B is 42 and C is 13, find A. Answer_____
If C is 30 and A is 40, find B. Answer_____

A minus B equals C

If A is 51 and B is 23, find C. Answer_____
If B is 35 and C is 13, find A. Answer_____
If A is 27 and C is 16, find B. Answer_____

6. If John earns $6.75 a day and Ernest earns $8.00 a day, how much more does Ernest earn than John in 20 days?
Answer_____

7. If 8 barrels of flour cost $56, how much do 4½ barrels cost? Ans.__

8. What number multiplied by 6 equals 12 x 5 - 30? Answer_____

9. John borrows $300 at 6% and Albert borrows $300 at 4%. How much more interest does John pay in a year than Albert?

10. If you buy a box of pencils at $3.00 a box and sell them for $4.00, making 4¢ on each pencil, how many pencils were in the box? Answer_____

B g

ELWELL-FOWLKES BOOKKEEPING TEST

By Fayette H. Elwell, B.A., C.P.A.
Professor of Accounting, University of Wisconsin

and John Guy Fowlkes, Ph.D.
Professor of Education, University of Wisconsin

1B

TEST 1: FORM B

For End of First Semester

Do not open this booklet until you are told to do so. Fill in these blanks, giving your name, age, etc. *Write plainly.*

Name..... .....
(First name, initial, and last name)

Age last birthday.....years. Class.....

School.....Teacher.....

City.....Date.....19.....

Directions. This test consists of nine parts. When you have finished one part, go back over it to make sure that all your answers are correct; then go on to the next part. Each part is preceded by directions telling just how to answer the questions. Read the directions carefully before answering the questions. Wait until you are told to turn this page.

Part	Score	
I		
II		
III		
IV		
V		
VI		
VII		
VIII		
IX		
Total Score		

☞ *To the Scorer:* The two columns under Score are to help you keep the tens and units figures in columns.

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PART I. GENERAL THEORY

DIRECTIONS. Below are some statements, some of which are true and some of which are false. You will notice that *True* and *False* are printed after each statement. If you think a statement is true, underline *True;* and if you think a statement is false, underline *False.* Classify only the statements about which you feel sure. *Do not guess.*

SAMPLE. In bookkeeping, values received are called credits.... True False

---

1. The total of all the debits as recorded in the ledger accounts should equal the total of all the credits..... True False

2. The cost of merchandise sold is always the difference between the total merchandise sales and the total merchandise purchases True False

3. The debits in a book of original entry are posted as credits in the ledger..... True False

4. A net profit increases the proprietary interest (proprietorship)..... True False

5. A credit balance in the Proprietor's Drawing (Personal) account at the close of the first period in business indicates that the net profit is in excess of the withdrawals..... True False

6. When an interest-bearing note is given in payment of an account, Notes Payable and Interest Expense (Interest Cost, Interest Paid) are credited..... True False

7. A debit balance in the Notes Receivable account indicates that all notes received have not been paid..... True False

8. A separate posting to the Cash account is made for each item in the cash journal (cash book)..... True False

9. The entry to record the receipt of a note from a customer is made in the general journal (journal)..... True False

10. The closing entries for a business are usually made at the end of each fiscal period..... True False

Go back and make sure your answers are correct. Then go on to the next page.

Number right.....(Score)

B g

PART II. GENERAL THEORY

DIRECTIONS. Below are some questions, each of which has five answers. Only one of the answers is correct. In the parentheses after each question, write the number of the answer which you think is correct. In each case write only *one* number.

SAMPLE. A debit in a creditor's account indicates:

(1) a purchase on account. (4)
(2) a sale for cash.
(3) a sale on account.
(4) a payment on account.
(5) a receipt of a note.

---

1. The separation of a transaction into its debit and credit elements is called ( )

(1) taking a trial balance.
(2) journalizing.
(3) posting.
(4) closing the ledger.
(5) balance sheet equation.

2. A payment of cash by a business to C. M. Allen to apply on account ( )

(1) decreases proprietary interest (proprietorship).
(2) increases gross profit.
(3) decreases liabilities.
(4) decreases gross profit.
(5) increases liabilities.

3. The trial balance of J. M. Harris shows a debit balance in the Hall & Co. account. This account represents ( )

(1) an asset.
(2) an operating expense.
(3) a net loss.
(4) a liability.
(5) a proprietary interest (proprietorship) item.

4. A credit balance in the Profit and Loss account, after closing the various income and expense accounts into it, represents ( )

(1) net loss.
(2) gross profit on sales.
(3) net profit.
(4) operating expenses.
(5) gross loss on sales.

5. The amount of fuel consumed during a period should appear ( )

(1) in the profit and the loss statement as an operating expense.
(2) in the balance sheet (financial statement) as a liability.
(3) in the balance sheet (financial statement) as an asset.
(4) in the profit and loss statement as an additional cost of merchandise sold.
(5) in the profit and loss statement as additional income.

Go back and make sure your answers are correct. Then go on to the next page.

Number right..... *(Score)*

B g

PART III. GENERAL THEORY

DIRECTIONS. Below is a series of statements, in each of which something is omitted. On the blank after each statement, write the word or words which will make the statement complete and true in meaning.

SAMPLE.

A credit in the Cash account represents cash ——. (_____ *paid* _____)

---

1. The Merchandise Sales account is classified as a (an) —— account . . . . . (_____)

2. An increase in an account payable is —— to the individual creditor's account . . . . . (_____)

3. At the close of each period, the Interest Expense (Interest Cost, Interest Paid) account is closed into the —— account . . . . . (_____)

4. Decreases in assets are —— to the proper asset account . . . . . (_____)

5. The total of the sales journal (sales book) is posted to the —— of the Merchandise Sales account . . . . . (_____)

6. The transferring of the debits and credits from the book of original entry to the ledger is called —— . . . . . (_____)

7. The condition of a business at a definite time is shown by the —— . . . . . (_____)

8. If the fuel used during the period is ignored, the profit for the period will be —— stated . . . . . (_____)

9. An increase in salaries paid tends to —— the proprietary interest (proprietorship) . . . . . (_____)

10. Interest paid on a note given by the business —— net profit . . . . . (_____)

Go back and make sure your answers are correct. Then go on to the next page.

Number right . . . . . (*Score*)

B g

PART IV. JOURNALIZING

DIRECTIONS. Below are some questions, each of which has five answers. Only one of the answers is correct. In the parentheses after each question, write the number of the answer which you think is correct, as shown in the sample. In each case write only *one* number.

SAMPLE. Paid cash, $100, for rent of store for month.

(1) Debit Salaries; credit Cash.
(2) Debit Rent Expense; credit Cash.
(3) Debit Proprietor, Drawing (Personal); credit Notes Payable.
(4) Debit Furniture and Furnishings; credit Cash.
(5) Debit Proprietor, Drawing (Personal); credit Cash.

(2)

---

1. Sold the X Company merchandise, $250, on account

(1) Debit Cash; credit Merchandise Sales.
(2) Debit X Company; credit Merchandise Sales.
(3) Debit Proprietor, Drawing (Personal); credit Merchandise Sales.
(4) Debit Merchandise Purchases; credit X Company.
(5) Debit X Company; credit Merchandise Purchases.

( )

2. The business paid $40 for a personal bill of the proprietor.

(1) Debit Proprietor, Drawing (Personal); credit Cash.
(2) Debit Proprietor, Investment (Capital); credit Cash.
(3) Debit Salaries; credit Cash.
(4) Debit Proprietor, Drawing (Personal); credit Salaries.
(5) Debit Salaries; credit Proprietor, Drawing (Personal).

( )

3. Sent a credit memorandum for $80 to the X Company for merchandise returned by them.

(1) Debit Sales Returns and Allowances; credit X Company.
(2) Debit X Company; credit Purchases Returns and Allowances.
(3) Debit Merchandise Purchases; credit X Company.
(4) Debit X Company; credit Sales Returns and Allowances.
(5) Debit X Company; credit Cash.

( )

4. Gave M. Black a non-interest-bearing note for $600 to apply on account.

(1) Debit M. Black; credit Merchandise Sales.
(2) Debit Interest Expense (Interest Cost, Interest Paid); credit M. Black.
(3) Debit Merchandise Purchases; credit Notes Payable.
(4) Debit Notes Receivable; credit M. Black.
(5) Debit M. Black; credit Notes Payable.

( )

5. Paid the proprietor $100 in cash for clerical services.

(1) Debit Proprietor, Drawing (Personal); credit Cash.
(2) Debit Salaries; credit Proprietor, Drawing (Personal).
(3) Debit Merchandise Purchases; credit Cash.
(4) Debit Salaries; credit Cash.
(5) Debit Salaries; credit Proprietor, Investment (Capital).

( )

Go on to the next page.

B g

PART IV. JOURNALIZING *(Continued)*

6. Purchased merchandise, $400, from S. Watson on account.

(1) Debit Purchases Returns and Allowances; credit S. Watson.
(2) Debit Proprietor, Investment (Capital); credit Merchandise Purchases.
(3) Debit Merchandise Purchases; credit S. Watson.
(4) Debit Merchandise Purchases; credit Cash.
(5) Debit Proprietor, Drawing (Personal); credit S. Watson.

( )

7. Paid the non-interest-bearing note due M. Black.

(1) Debit Notes Payable; credit Notes Receivable.
(2) Debit Notes Receivable; credit Cash.
(3) Debit Notes Payable; credit M. Black.
(4) Debit Notes Payable; credit Cash.
(5) Debit M. Black; credit Notes Payable.

( )

8. Received a credit memorandum for $100 from S. Watson for merchandise returned to him.

(1) Debit Cash; credit Purchases Returns and Allowances.
(2) Debit S. Watson; credit Purchases Returns and Allowances.
(3) Debit Notes Receivable; credit S. Watson.
(4) Debit Sales Returns and Allowances; credit S. Watson.
(5) Debit S. Watson; credit Sales Returns and Allowances.

( )

9. Paid D. Winter cash, $10, for cartage on a sale to G. Foster.

(1) Debit D. Winter; credit Merchandise Sales.
(2) Debit D. Winter; credit Cash.
(3) Debit Freight In; credit D. Winter.
(4) Debit D. Winter; credit Cartage Out.
(5) Debit Cartage Out; credit Cash.

( )

10. Received a note for $300 from F. Baker in full of account.

(1) Debit Notes Receivable; credit Merchandise Purchases.
(2) Debit Sales Returns and Allowances; credit F. Baker.
(3) Debit Notes Receivable; credit F. Baker.
(4) Debit Notes Receivable; credit Proprietor, Investment (Capital).
(5) Debit F. Baker; credit Cash.

( )

Go back and make sure your answers are correct. Then go on to the next page.

Number right.....*(Score)*

PART V. CLASSIFICATION

DIRECTIONS. Indicate by a check mark (✓) whether the balances of the following accounts taken from the ledger of G. H. Perry would appear as debits or as credits. Show by entering in the column headed "Classification" the correct classification numbers from those given below.

1 Asset
2 Liability
3 Proprietary Interest (Proprietorship)
4 Income
5 Deduction from Income
6 Expense
7 Deduction from Expense

		DEBIT	CREDIT	CLASSIFICATION
SAMPLE. Cartage Out		(✓)	( )	(*6*)
1. Accounts with creditors	1.	( )	( )	( )
2. Accounts with debtors	2.	( )	( )	( )
3. Cash	3.	( )	( )	( )
4. Freight and Cartage In	4.	( )	( )	( )
5. Fuel (Fuel Used or Fuel Expense)	5.	( )	( )	( )
6. Fuel Inventory (Fuel or Sundry Expense Inventory)	6.	( )	( )	( )
7. Furniture and Furnishings	7.	( )	( )	( )
8. Interest Expense (Interest Cost or Interest Paid)	8.	( )	( )	( )
9. Interest Income (Interest Earned)	9.	( )	( )	( )
10. Merchandise Discount on Purchases	10.	( )	( )	( )
11. Merchandise Discount on Sales	11.	( )	( )	( )
12. Merchandise Inventory (end of period)	12.	( )	( )	( )
13. Merchandise Purchases	13.	( )	( )	( )
14. Merchandise Sales	14.	( )	( )	( )
15. Notes Payable	15.	( )	( )	( )
16. Notes Receivable	16.	( )	( )	( )
17. Office Supplies (Office Supplies Used or Office Supplies Expense)	17.	( )	( )	( )
18. Office Supplies Inventory (Office Supplies or Sundry Expense Inventory)	18.	( )	( )	( )
19. Perry, Drawing (Personal) (when the debits exceed the credits)	19.	( )	( )	( )
20. Perry, Investment (Capital)	20.	( )	( )	( )
21. Profit and Loss (when its balance shows a profit)	21.	( )	( )	( )
22. Purchases Returns and Allowances	22.	( )	( )	( )
23. Rent Expense	23.	( )	( )	( )
24. Salaries	24.	( )	( )	( )
25. Sales Returns and Allowances	25.	( )	( )	( )

Go back and make sure your answers are correct. Then go on to the next page.

Number right ..... ÷ 2 = ... *(Score)*

B g

PART VI. ADJUSTING ENTRIES AND CLOSING THE LEDGER

DIRECTIONS. From the list of accounts given here, select those which should be used to record the necessary adjusting and closing entries indicated below and write the numbers of the accounts in the Debit and Credit columns.

1 Fuel (Fuel Used or Fuel Expense)
2 Fuel Inventory (Fuel or Sundry Expense Inventory)
3 Merchandise Inventory
4 Merchandise Purchases
5 Merchandise Sales
6 Office Supplies (Office Supplies Used or Office Supplies Expense)
7 Office Supplies Inventory (Office Supplies or Sundry Expense Inventory)
8 Profit and Loss
9 Proprietor, Drawing (Personal)
10 Proprietor, Investment (Capital)
11 Purchases Returns and Allowances
12 Rent Expense
13 Salaries
14 Sales Returns and Allowances

	DEBIT	CREDIT
SAMPLE. To close the account recording the rent paid for the period	(*8*)	(*12*)
1. To close the Purchases Returns and Allowances account	( )	( )
2. To close the Sales Returns and Allowances account	( )	( )
3. To record the merchandise inventory at the close of the period	( )	( )
4. To close the Merchandise Purchases account	( )	( )
5. To close the Merchandise Sales account if a gross profit results	( )	( )
6. To close the account recording the cost of office supplies used during the period	( )	( )
7. To close the account recording the cost of fuel used during the period	( )	( )
8. To close the account recording the amount paid the proprietor for his services for the period	( )	( )
9. To transfer the net profit for the period to the proper account	( )	( )
10. To transfer the net loss for the period to the proper account	( )	( )

Go back and make sure your answers are correct. Then go on to the next page.

Number right..... *(Score)*

PART VII. STATEMENTS

DIRECTIONS. Below are some statements, some of which are true and some of which are false. If you think a statement is true, underline *True;* if you think a statement is false, underline *False. Do not guess.*

SAMPLE. In bookkeeping, values received are called credits.... True False

---

1. The formal statement of assets, liabilities, and proprietary interest (proprietorship) is called a profit and loss statement. True False

2. The balance of the income and expense accounts appear at the close of a period in a proof or post-closing trial balance..... True False

3. A personal account in which the debit exceeds the credit would appear in the balance sheet (financial statement) as an asset .. True False

4. In the profit and loss statement, the net operating profit is determined by subtracting the operating expenses from the gross profit..... True False

5. In the account form of a balance sheet (financial statement) the assets plus the liabilities equal the proprietary interest (proprietorship)..... True False

6. The payment of a note payable by the business decreases liabilities..... True False

7. A net loss increases the credit in the Proprietor's Drawing (Personal) account..... True False

8. The amount of office supplies on hand at the end of a period should be entered in the profit and loss statement as an expense True False

9. If the merchandise inventory at the end of a period is ignored, the gross profit in the profit and loss statement will be understated True False

10. If the Proprietor, Drawing (Personal) account shows a credit balance at the close of a period, it would appear in the balance sheet (financial statement) as an addition to the Proprietor's Investment (Capital) account..... True False

Go back and make sure your answers are correct. Then go on to the next page.

Number right.....(Score)

B g

PART VIII. STATEMENTS

DIRECTIONS. Below is a series of statements, in each of which something is omitted. On the blank after each statement write the word or words, term or terms, which will make the statement complete and true in meaning.

SAMPLE.

A credit in the Cash account represents cash ——. (*paid*)

---

1. In the report form of a balance sheet (financial statement) the proprietary interest (proprietorship) is the difference between the liabilities and the —— . . . . . (_____)

2. A net loss —— the proprietary interest (proprietorship) . . . . . (_____)

3. At the close of a period all income and expense accounts are closed into the —— account . . . . . (_____)

4. Gross profit is the excess of the sales over the —— of merchandise sold . . . . . (_____)

5. The net operating profit of a business is the excess of the gross profit of the business over the —— . . (_____)

Go back and make sure your answers are correct. Then go on to the next page.

Number right . . . . . (*Scor*)

B g

PART IX. STATEMENTS

DIRECTIONS. Read each of the following transactions. If it affects the Profit and Loss statement, underline *Yes*. If not, underline *No*.

SAMPLE. Paid cash for use of store for month..... Yes No

---

1. Paid a note due M. Bender with interest..... Yes No
2. Received cash from a customer in full of account..... Yes No
3. Sold merchandise to L. Black at a profit..... Yes No
4. Paid R. Ronald cash for his services for the month..... Yes No
5. Gave D. Hunt a non-interest-bearing note to apply on account Yes No
6. Paid the freight bill on a shipment of merchandise to B. Nevins .. Yes No
7. Received payment from G. Allen for a non-interest-bearing note due the business..... Yes No
8. Purchased desk for office use for cash..... Yes No
9. Bought three tons of coal for cash. The three tons were unused at the end of the month..... Yes No
10. Paid cash for use of store for month..... Yes No

Go back and make sure your answers are correct.

Number right..... ÷ 2 = ...(*Score*)

B h

Bookkeeping Test No. 1 — Series K

Journalizing and Posting

Based on 20th Century Bookkeeping and Accounting (18th Edition)

Carlson, Prickett, Forkner

Chapters 1 to 5 Inclusive

Prepared by

PAUL A. CARLSON

Director of Commercial Education, State Teachers College
Whitewater, Wisconsin

PUBLISHED BY

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INSTRUCTIONS

Do not open this booklet until you are told to do so. First fill in all of the blanks given above between the two sets of double lines (except the space for total time used in writing this test).

The contents of this test are outlined in the scoring rectangle at the right. Section A is a true-false test; Section B is an alternate-response test; Section C is a debit-credit test; Section D is a multiple-choice test; and Section E is a matching test.

Specific directions regarding the work to be done and one sample are given at the beginning of each part of the test. All samples are marked "0."

Do not ask questions while writing this test.

FOR USE IN SCORING	Perfect Score	Student's Score
Page 2—Beginning Principles The Meaning of Debit and Credit	45	
Page 3—Journalizing Transactions Posting and the Proof of Posting	34	
Page 4—Vocabulary of Journalizing, Posting, and the Trial Balance	30	
Total Score	109	

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SECTION A—BEGINNING PRINCIPLES

DIRECTIONS: After each statement below that is true, draw a line under "true." If the statement is false, draw a line under "false." The first statement is given as a sample.

	Answers	For Scoring
0. The things of value that a person owns are called liabilities	true <u>false</u>	0. √
1. The difference between what is owned and what is owed is called net worth	true false	1.
2. If there are no debts, assets equal liabilities	true false	2.
3. The claims of creditors on the assets are called liabilities	true false	3.
4. The proprietor's claim on the assets is called his proprietorship	true false	4.
5. If A has assets of $6,000 and liabilities of $1,500, he is worth $7,500	true false	5.
6. If B has a proprietorship of $7,000 and owes $1,000, his assets total $8,000	true false	6.
7. Proprietorship equals assets less liabilities	true false	7.
8. Transactions change the balances of the accounts	true false	8.
9. It is customary to place the proprietorship accounts in the first division of the ledger	true false	9.
10. The title of each account should be descriptive of the type of items that are placed under it	true false	10.
11. A person to whom a debt is owed is called a debtor	true false	11.
12. Liabilities indicate equities in assets	true false	12.
13. Ownership of a United States Government bond is a liability	true false	13.
14. When there are debts, equities consist of two types of claims	true false	14.
15. In bookkeeping, money is referred to as Cash	true false	15.
16. Ownership is usually referred to as proprietorship	true false	16.
17. All debts are referred to as assets	true false	17.
18. The one from whom an amount is to be collected is known as a creditor	true false	18.
19. The total liabilities are the amount owed to all creditors	true false	19.
20. The information given at the top of the balance sheet is known as the heading	true false	20.
21. Assets owned for personal use are called business assets	true false	21.
22. Debts incurred in the operation of a business are known as personal liabilities	true false	22.
23. Buying a notebook involves the completion of a transaction	true false	23.
24. The simplest form of an account is known as a balance sheet	true false	24.
25. The name of an account is called the account title	true false	25.
26. The left side of an account is the debit side	true false	26.
27. The right side of an account is the credit side	true false	27.
28. The amount to be subtracted in an account is written on the side opposite the amount from which it is to be deducted	true false	28.
29. The trial balance is a test of the equality of debits and credits in the ledger	true false	29.
30. A trial balance in balance proves the complete accuracy of the bookkeeping records	true false	30.

SECTION B—THE MEANING OF DEBIT AND CREDIT

DIRECTIONS: Complete each statement by underlining the correct word at the end of each line. The first statement, "0," is given as a sample.

	Answers	For Scoring
0. The proprietor's original investment in the business is recorded in his account as a	debit <u>credit</u>	0. √
1. All increases in assets are recorded in the appropriate accounts as	debits credits	1.
2. All increases in liabilities are recorded in the appropriate accounts as	debits credits	2.
3. All increases in proprietorship are recorded in the appropriate accounts as	debits credits	3.
4. All increases in income are recorded in the appropriate accounts as	debits credits	4.
5. All increases in expenses are recorded in the appropriate accounts as	debits credits	5.
6. All decreases in assets are recorded in the appropriate accounts as	debits credits	6.
7. All decreases in liabilities are recorded in appropriate accounts as	debits credits	7.
8. All decreases in proprietorship are recorded in appropriate accounts as	debits credits	8.
9. All decreases in income are recorded in appropriate accounts as	debits credits	9.
10. All decreases in expenses are recorded in appropriate accounts as	debits credits	10.
11. All cash receipts are recorded in the cash account as	debits credits	11.
12. All cash payments are recorded in the cash account as	debits credits	12.
13. All charges to customers are recorded in the customers' accounts as	debits credits	13.
14. All sales are recorded in the sales account as	debits credits	14.
15. All expenses are recorded in some expense account as	debits credits	15.

Perfect Score: 45
Deductions .....
Net Score .....

SECTION C—TRANSACTIONS TO BE JOURNALIZED

B h

DIRECTIONS: Indicate the titles of the accounts to be debited and credited in making the journal entries for the transactions given below by writing the numbers of the account titles in the appropriate columns. Select the numbers from the "List of Accounts" given at the left of the transactions. The first transaction, "0," is given as a sample. Each debit counts one point and each credit counts one point.

LIST OF ACCOUNTS (Arranged Alphabetically)	TRANSACTIONS	Debit	For Scoring Debits	Credit	For Scoring Credits
(1) Cash	0. Paid cash for telegram	8	0. √	1	0. √
(2) Creditor	1. Received cash from proprietor to increase investment		1.		1.
(3) Customer	2. Bought delivery equipment on account		2.		2.
(4) Delivery Equipment	3. Bought additional machinery on account		3.		3.
(5) Delivery Expense	4. Bought paper, string, and other supplies for cash		4.		4.
(6) Labor Expense	5. Sale on account to charge customer		5.		5.
(7) Machinery	6. Paid the wages for labor with cash		6.		6.
(8) Miscellaneous Expense	7. Received a check from a customer in full of his account		7.		7.
(9) Power Expense	8. Paid the electricity bill for power for the month.		8.		8.
(10) Proprietor's Capital	9. Gave a check to a creditor to apply on account.		9.		9.
(11) Sales	10. Paid this month's telephone bill		10.		10.
(12) Supplies Expense	11. Recorded the cash sales for the week		11.		11.
	12. Paid for gas and oil for the delivery truck used this week		12.		12.

SECTION D—POSTING AND PROOF OF POSTING

DIRECTIONS: In each of the following sentences underline the phrase that best completes the statement, and insert within the parentheses in the answers column at the right the letter corresponding to the phrase selected. The first sentence is given as a sample.

	Answers	For Scoring
0. In posting an amount of sixty dollars, the amount is written (A) 60. (B) 60.00 (C) 60—	(C)	0. √
1. The process of transferring entries from a journal to a ledger is called (A) journalizing (B) posting (C) proving	( )	1.
2. The year of the debit entries in an account is written on the debit side of the account at the top of the (A) month column (B) day column (C) explanation column	( )	2.
3. The explanation column of the account is used to record (A) dates (B) amounts (C) special information	( )	3.
4. The first total of each side of an account is called a (A) grand total (B) pencil footing (C) subtotal	( )	4.
5. The difference between the footings of the two sides of an account is called the (A) debit footing (B) credit footing (C) balance	( )	5.
6. At the end of the month, the balance of any account is (A) the total of the debit side (B) the total of the credit side (C) the difference between the two sides	( )	6.
7. The balance of the cash account represents the (A) total cash receipts (B) total cash payments (C) cash on hand	( )	7.
8. If there is a cash balance, the total of the debit side of the cash account is (A) larger than the credit side (B) smaller than the credit side (C) the same size as the credit side	( )	8.
9. Ascertaining that the cash on hand agrees with the balance of the cash account is known as (A) footing the cash account (B) proving cash (C) ruling the cash account	( )	9.
10. A device used to test the equality of debits and credits in the ledger is known as a (A) journal (B) balance sheet (C) trial balance	( )	10.

Perfect Score: 34
Deductions .....
Net Score .....

SECTION E—VOCABULARY OF JOURNALIZING, POSTING, AND THE TRIAL BALANCE

DIRECTIONS: Complete each statement below in Column II by selecting one of the terms given in Column I and writing its number within the parentheses after the incomplete statement. The first answer is given as a sample.

COLUMN I

(Arranged Alphabetically)

(1) account
(2) account title
(3) balance
(4) book of original entry
(5) book of final entry
(6) chart of accounts
(7) chronological order
(8) combined entry
(9) credit footing
(10) creditor
(11) credit side
(12) date
(13) debit footing
(14) debit side
(15) debtor
(16) explanation
(17) explanation column
(18) folio column
(19) general journal
(20) in balance
(21) journal entry
(22) journalizing
(23) journal page column
(24) ledger
(25) opening an account
(26) opening entry
(27) out of balance
(28) pencil footing
(29) posting
(30) posting reference column
(31) proving cash
(32) trial balance of balances
(33) trial balance of totals

COLUMN II	Answers	For Scoring
0. Transactions are recorded in the general journal in	(7)	0. √
1. The first journal entry in a new set of books is known as the	( )	1.
2. The complete record of each transaction in a journal is referred to as a	( )	2.
3. The process of recording a transaction in a journal is called	( )	3.
4. The name of an account is referred to as the	( )	4.
5. The left side of an account is known as the	( )	5.
6. The right side of an account is known as the	( )	6.
7. A general journal is classified as a	( )	7.
8. A journal entry involving more than one debit element or more than one credit element is known as a	( )	8.
9. That part of the journal entry which describes the whole transaction is known as the	( )	9.
10. A device for grouping and summarizing the changes caused by transactions is called an	( )	10.
11. A group of accounts is known as a	( )	11.
12. The ledger is classified as a	( )	12.
13. Transferring entries from the journal to the ledger is referred to as.	( )	13.
14. A list of accounts arranged in the order in which they will be found in the ledger is known as a	( )	14.
15. Writing the name of the account on the heading line of the ledger page is called	( )	15.
16. The time at which a transaction is completed is known as the	( )	16.
17. The journal page column in the account is sometimes called the	( )	17.
18. The ledger page column in the journal is usually referred to as the.	( )	18.
19. Any special information that may be of definite value to the user of the account is written in the	( )	19.
20. A person to whom money is owed is usually referred to as a	( )	20.
21. The footing of each side of an account in very small figures is referred to as a	( )	21.
22. The small pencil total on the left-hand side of an account is called a	( )	22.
23. The small pencil total on the right-hand side of an account is called a	( )	23.
24. The difference between the two sides of an account is known as the.	( )	24.
25. If the two totals of a trial balance are equal, the trial balance is said to be	( )	25.
26. If the two totals of a trial balance are not equal, the trial balance is said to be	( )	26.
27. A trial balance that lists only account balances is called a	( )	27.
28. A trial balance that lists the debit total and the credit total of each account is called a	( )	28.
29. The standard form of the trial balance is the	( )	29.
30. Ascertaining that the cash on hand agrees with the balance of the cash account is known as	( )	30.

Perfect Score: 30
Deductions .....
Net Score .....

B 1

Bookkeeping Test No. 2 — Series K

Interpreting Records

Based on 20th Century Bookkeeping and Accounting (18th Edition)

Carlson, Prickett, Forkner

Chapters 6 to 10 Inclusive

Prepared by

PAUL A. CARLSON

Director of Commercial Education, State Teachers College
Whitewater, Wisconsin

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The contents of this test are outlined in the scoring rectangle at the right. Section A is a true-false test; Sections B and C are check-list tests; Section D is a debit-credit test; and Section E is a multiple-choice test.

Specific directions regarding the work to be done and one sample are given at the beginning of each part of the test. All samples are marked "0."

Do not ask questions while writing this test.

FOR USE IN SCORING	Perfect Score	Student's Score
Page 2—Principles of Bookkeeping and Accounting	50	
Page 3—Work at the End of the Fiscal Period	34	
Page 4—Bookkeeping for Individuals and Social Organizations	20	
Total Score	104	

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SECTION A—PRINCIPLES OF BOOKKEEPING AND ACCOUNTING

DIRECTIONS: After each statement below that is true, draw a line under "true." If the statement is false, draw a line under "false." The first answer is underlined as a sample and is labeled "0."

UNIT 1—THE PROFIT AND LOSS STATEMENT	Answers	For Scoring
0. Separate financial reports are prepared from the different sections of the working trial balance	true false	0. ✓
1. The profit and loss statement is prepared at the beginning of each fiscal period	true false	1.
2. The profit and loss statement proves the equality of debits and credits in the ledger	true false	2.
3. The heading of the profit and loss statement contains the name of the firm only	true false	3.
4. The profit and loss statement lists the balances of all the income and all the expense accounts	true false	4.
5. In the preparation of the profit and loss statement, the expenses are listed first	true false	5.
6. The period covered by the profit and loss statement is known as the fiscal period	true false	6.
7. The profit and loss statement shows whether the proprietorship is increasing or decreasing	true false	7.
8. Every profit and loss statement shows the net worth of the business for which it was prepared	true false	8.
9. If the total income is larger than the total expenses, the difference is net loss	true false	9.
10. If the total expenses are larger than the total income, the difference is net profit	true false	10.
11. The profit and loss statement reports the progress of the business for a past fiscal period	true false	11.
12. The profit and loss statement is prepared from the information in the balance sheet columns of the working trial balance	true false	12.
UNIT 2—THE BALANCE SHEET		
13. Some elements of the balance sheet change every day	true false	13.
14. Accounts receivable are usually listed on the balance sheet in one amount	true false	14.
15. A balance sheet reports the financial condition of the business on a specific date	true false	15.
16. In the preparation of the balance sheet, the proprietorship of the business is listed first	true false	16.
17. The difference between what is owned and what is owed is called liabilities	true false	17.
18. The things of value that the business owns are called assets	true false	18.
19. All debts are listed on the balance sheet as expenses	true false	19.
20. The total amount to be collected from customers is listed on the balance sheet as Accounts Payable	true false	20.
21. The claims of creditors in the assets of a business are known as liabilities	true false	21.
22. The balance sheet equation is: Assets equal Liabilities plus Proprietorship	true false	22.
23. If A has assets of $3,000 and liabilities of $1,000, he is worth $4,000	true false	23.
24. If B's proprietorship is $10,000 and he owes $3,500, his assets must total $13,500	true false	24.
UNIT 3—CLOSING THE LEDGER		
25. Closing entries are prepared at the end of each fiscal period	true false	25.
26. Before the closing entries are made, the net profit is shown in one amount in the proprietor's capital account	true false	26.
27. An entry in the general journal to transfer the balance of one account to another account is called a closing entry	true false	27.
28. The closing entries are usually prepared from the balance sheet columns of the working trial balance	true false	28.
29. The summarizing account to which the income and the expense accounts are transferred is the cash account	true false	29.
30. The accounts that are transferred to the credit side of the profit and loss summary account are income accounts	true false	30.
31. The accounts that are transferred to the debit side of the profit and loss summary account are expense accounts	true false	31.
32. When all of the closing entries have been posted, the sales account shows a debit balance	true false	32.
33. When all of the closing entries have been posted, each expense account shows a credit balance	true false	33.
34. If the credit side of the profit and loss summary account is the larger side, the balance is a net profit	true false	34.
35. The post-closing trial balance contains the same account balances as the profit and loss statement	true false	35.
36. When the expense accounts have been closed by the short method, the expenses appear in the profit and loss summary account in one amount	true false	36.
UNIT 4—THE USE OF BANKING SERVICES		
37. A written order directing the bank to make payment from the amount deposited is known as a check	true false	37.
38. Each new depositor is required to write his name on a signature card	true false	38.
39. The depositor may authorize others to issue checks in the depositor's name	true false	39.
40. Cash items include accounts receivable	true false	40.
41. The first endorsement on the back of a check is written near the left end	true false	41.
42. All items to be deposited are listed on a bank draft	true false	42.
43. A. B. A. numbers are bank identification numbers	true false	43.
44. The second part of the A. B. A. number refers to a specific bank	true false	44.
45. The check-stub record should show the new bank balance after each check is written	true false	45.
46. The check stub should contain the same information as the check detached from it	true false	46.
47. The check stub should always be filled out before the check is written	true false	47.
48. The bank renders each depositor a statement of account each week	true false	48.
49. All of the depositor's canceled checks are returned to him with his bank statement	true false	49.
50. Verifying the bank statement with the check-stub record is known as reconciling the bank account	true false	50.

Page 2: Perfect Score 50 — Deductions _____ = Net Score. . ☐

SECTION B—THE NATURE OF ACCOUNT BALANCES

B 1

DIRECTIONS: After each account title listed or described below, make a check mark (√) in the appropriate trial balance column to show in which column the account balance usually appears.

ACCOUNT TITLES	Trial Balance		For Scoring
	Dr.	Cr.	
0. Cash	√		0. √
1. Delivery Equipment			1.
2. Delivery Expense			2.
3. Each creditor's account			3.
4. Each customer's account			4.
5. Labor Expense			5.
6. Machinery			6.
7. Miscellaneous Expense			7.
8. Power Expense			8.
9. Proprietor's Capital			9.
10. Sales			10.
11. Supplies Expense			11.

SECTION C—CLASSIFICATION OF ACCOUNTS

DIRECTIONS: After each account title listed or described below, make a check mark (√) in the column to which the balance of the account will be extended from the trial balance columns of the working trial balance.

ACCOUNT TITLES	P. & L. Statement		Balance Sheet		For Scoring
	Expenses	Income	Assets	Liab. & Prop.	
0. Cash			√		0. √
1. Delivery Equipment					1.
2. Delivery Expense					2.
3. Each creditor's account					3.
4. Each customer's account					4.
5. Labor Expense					5.
6. Machinery					6.
7. Miscellaneous Expense					7.
8. Power Expense					8.
9. Proprietor's Capital					9.
10. Sales					10.
11. Supplies Expense					11.

SECTION D—THE CLOSING ENTRIES

DIRECTIONS: Indicate the accounts to be debited and the accounts to be credited in making the closing entries for the data given below by writing the numbers of these accounts in the appropriate columns. Select the numbers from the "List of Accounts" given at the left of the "Data." The first entry, "0," is given as a sample. Each debit counts one point and each credit counts one point.

LIST OF ACCOUNTS
(Arranged Alphabetically)

(1) Cash
(2) Delivery Equipment
(3) Delivery Expense
(4) Each creditor's account
(5) Each customer's account
(6) Labor Expense
(7) Miscellaneous Expense
(8) Power Expense
(9) Profit and Loss Summary
(10) Proprietor's capital account
(11) Sales
(12) Supplies Expense

DATA	Debit	For Scoring Debits	Credit	For Scoring Credits
0. Close the power expense account	9	0.	8	0.
1. Close the sales account		1.		1.
2. Close the delivery expense account		2.		2.
3. Close the supplies expense account		3.		3.
4. Close the labor expense account		4.		4.
5. Close the miscellaneous expense account		5.		5.
6. Transfer the net profit to the proprietor's capital account		6.		6.

Page 3 { Perfect Score: 34
Deductions .....
Net Score ..... [ ]

SECTION E—BOOKKEEPING FOR INDIVIDUALS AND SOCIAL ORGANIZATIONS

DIRECTIONS: In each sentence below underline the phrase that best completes the statement, and insert within the parentheses in the answers column at the right the letter corresponding to the phrase selected.

UNIT 1—PERSONAL BOOKKEEPING

	Answers	For Scoring
0. The first step in planning personal bookkeeping records should be the preparation of a (A) working trial balance (B) profit and loss statement (C) balance sheet	(C)	0. ✓
1. A written estimate of income and expenditures is called a (A) balance sheet (B) budget (C) personal record-book	( )	1.
2. In personal bookkeeping, the pocket memorandum book is used for (A) an immediate record (B) a journal record (C) a ledger record	( )	2.
3. The cash balance at the beginning of each period is recorded in the personal record-book in the (A) explanation column (B) cash receipts column (C) cash receipts column and the income credit column	( )	3.
4. The columns of the personal record-book should be footed and proved (A) at the end of each day (B) at the end of each week (C) only at the bottom of a page.	( )	4.
5. The sum of the totals of all credit columns should equal the (A) sum of the totals of all debit columns (B) total of the cash receipts column (C) total of the cash receipts column plus the beginning cash balance	( )	5.
6. An employed person's social security number (A) changes every year (B) changes when he changes employment (C) will not change.	( )	6.
7. The social security deductions are deducted from the salary (A) at the end of each year (B) when the employee changes employment (C) at the time the employee receives each salary check	( )	7.
8. An employed person covered by the Social Security Act is entitled to an old-age benefit when he reaches the age of (A) fifty years (B) sixty-five years (C) seventy years	( )	8.
9. The money columns of a social security record should contain (A) only the wages earned (B) only the taxes deducted (C) the wages earned and the taxes deducted	( )	9.
10. When a person changes employment, he should (A) apply for a new social security number (B) report his number to his new employer (C) report the change to the Social Security Board	( )	10.

UNIT 2—BOOKKEEPING FOR SOCIAL ORGANIZATIONS

11. The business transactions of social organizations are usually handled by the organization's (A) treasurer (B) advisor (C) individual members	( )	11.
12. The budget of a social organization is usually prepared by the (A) individual members (B) finance committee (C) treasurer	( )	12.
13. The immediate record of cash receipts of a social organization is the (A) check stub (B) receipted invoice (C) receipt stub	( )	13.
14. A book to keep a record of the amounts paid and the amounts owed by the members is called a (A) membership book (B) cashbook (C) cash journal	( )	14.
15. When a two-column cashbook is used, the cash balance is usually placed in the (A) explanation column (B) receipts column (C) payments column	( )	15.
16. The money columns of a two-column cashbook are footed and balanced (A) after each receipt or each payment (B) at the end of each week (C) at the end of the month	( )	16.
17. Each cash payment of the treasurer should be supported by a (A) receipt stub (B) receipted invoice (C) written statement prepared by the treasurer.	( )	17.
18. A classification of receipts and payments drawn up in permanent form for comparisons with the budget is known as the (A) treasurer's report (B) membership record (C) cash journal	( )	18.
19. The treasurer's report should be made (A) daily (B) weekly (C) monthly	( )	19.
20. A cashbook with many money columns is usually referred to as a (A) cash journal (B) petty cash book (C) statement of income and expenses	( )	20.

Page 4 — Perfect Score: 20; Deductions .....; Net Score .....

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